2 MARCH 1961

ONE SHILLING
AND SIXPENCE

ELECTRICAL TIMES

The NEW range of–

"MEMREX-EXEL" 500 volt Switchgear

PRESSED STEEL ENCLOSURES
FOR LIGHTNESS AND STRENGTH.
FRONT OPERATING SWITCH HANDLES.
REWIRABLE OR H.R.C.
10—15—30 Amp. Switches
10—15—30—60 Amp. Switchfuses.

Modern styling, sound technical performance and compliance with all relevant British Standard Specifications are basic essentials. The range complies with the most strict interpretation of I.E.E. Regulations (13th edition), and with the requirements of The Electricity (Factories Act) Special Regulations.

Features include

Cases of one piece pressed steel with hinged covers, rustproofed and finished light grey stove enamel.

Front operating switch handles improve appearance and permit more compact assemblies on switchboard and panels.

Fuses are of the new "Kantark-Exel" pattern which will accept rewirable or H.R.C. fuses. Semi-enclosed rewirable (damper type) patterns comply with B.S. 3036 : 1958.

M.E.M. H.R.C. cartridge fuse carriers are designed to accommodate H.R.C. cartridge fuse-links made to B.S. 88 : 1952, Appendix 'J' Dimensions, Form A—Offset Tags.

M.E.M. H.R.C. cartridge fuse-links have been A.S.T.A. certified for Categories of Duty 440 A.C.3 (16,500 amps.), 440 A.C.4 (33,000 amps.) and 440 A.C.5 (46,000 amps.).

WRITE FOR LIST 450T.

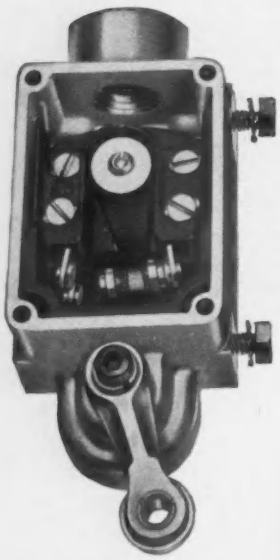
"Memrex-Exel" switches comply with the relevant Temperature Rise and Making and Breaking Capacity Tests of B.S. 861 : 1955 and Switch-fuses B.S. 2510 : 1954.

All these and many other features.

MEM

MIDLAND ELECTRIC MANUFACTURING CO. LTD.
REDDINGS LANE, TYSELEY, BIRMINGHAM, 11.

A STYLE APPLICABLE TO EVERY INDUSTRY



Two only replaceable assemblies in the electrical side: moulded one-piece contact block and arm. Interchangeable on all Mark II versions.

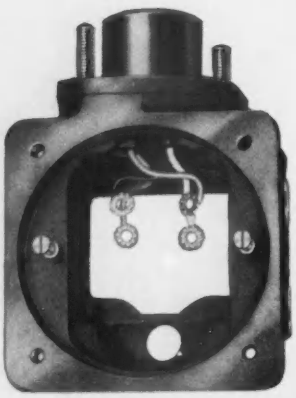
Water Oil and Dustproof or Flameproof versions

STANDARD

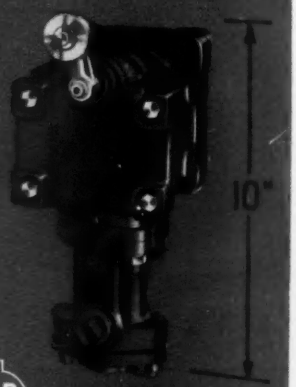
WATER, OIL & DUSTPROOF

Single pole, double break, double throw, operates with either circuit normally open with other closed, or maintaining in either position, or available with central (neutral) position and/or centre connection. Heavy aluminium die-cast case. Conduit ¾" B.S., or No. 3 Admiralty Pattern Cable gland entry. Two-screw side mounting or backplate mounting in two styles, or Tandem style (back to back mounting). Operating lever position adjustable in 7.5 deg. increments through 82.5 deg. either way from normal.

Standard Neutral position or Centre connection



The mechanism of the Flameproof switch is easily removable as a unit for servicing.

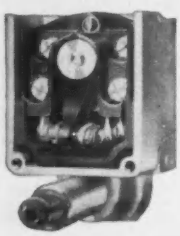


FLP FLAMEPROOF

SINGLE OR DOUBLE ENTRY

Buxton certificates No. 3574 (Group I) No. 3575 (Groups II and III gases). Meehanite iron castings. Self wiping solid silver contacts, interchangeable plugs and sockets. ***Single SWA cable entry (standard); double entry if required.*** *Operating lever position adjustable in 7.5 deg. increments through 360 degs. Single pole, double break, having one normally closed and one normally open circuit. Available with central (neutral) position and/or centre connection.*

MARK II



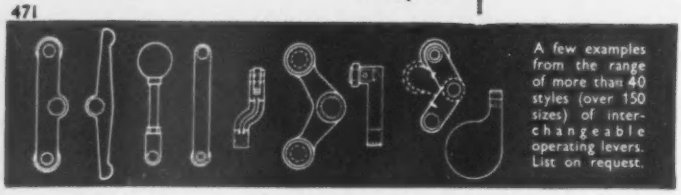
B.S.A. SNAP-LOCK ACME

Catalogue of switches and levers on request

HEAVY DUTY LIMIT SWITCHES

Made in England under Licence by
B.S.A. SMALL TOOLS LTD., BIRMINGHAM, 11

471



A few examples from the range of more than 40 styles (over 150 sizes) of interchangeable operating levers. List on request.

Sole Agents U.K.

BURTON GRIFFITHS & Co Ltd
SNAP-LOCK DEPT MONTGOMERY STREET
BIRMINGHAM 11. Tel: VICTORIA 2351

Old J.B.'s sitting on top of the world
Well, not exactly. Looks happy
though. I wonder? Let's see
Power Centre man called on Monday,
P.C. discussion on Wednesday,
out to lunch with P.C. man on
Friday. Power Centre? Got it!
J.B.'s installing Power Centre
Trunking. No wonder he looks
happy. Just think, P C. trunking
throughout. All the top people
use it. It's zinc coated for exceptional
durability and cuts installation costs
by as much as 33⅓% What an
investment. Wise man J.B.
Always goes the right way about
tackling a job.

If you've got a trunking job in mind,
take the first step in the right direction
by contacting Power Centre, or, send
for their fully descriptive literature.

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ELECTRICAL DIVISION

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with
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Trunking

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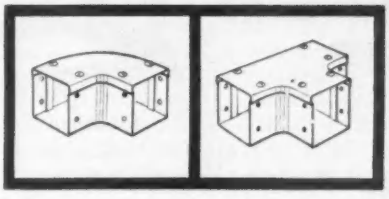
ELECTRICAL
ENGINEERS
EXHIBITION
EARLS COURT
MARCH 21st – 25th
VISIT US ON
STAND HI3 & HI5



Power Centre trunking fittings. Precision made. Speeds the job of installation. Layout extension or alteration made easy. Shown left, Elbow Assembly and Tee Assembly.

A

'Diamond H' Controls for domestic applications

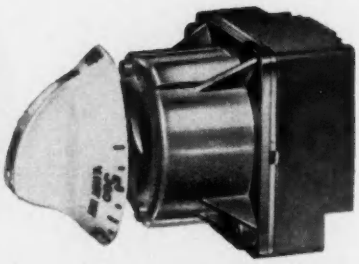
'DIAMOND H' SWITCHES LIMITED
GUNNERSBURY AVENUE, CHISWICK, LONDON, W.4
Telephone: Chiswick 6444 (5 lines). *Grams:* Diamonhart, Chisk, London

SNAP-IN NEON INDICATORS

60 Series (shallow lens) and 80A-82A Series snap-in fixing neon indicators suitable for circular or square panel mounting holes, available for 115, 250 or 415 volt supplies.

20 TH THERMOSTAT

A single pole, single circuit hydraulic slow break instrument rated at 16 amp. 250 v. A.C. Shallow projection easy wiring, rear terminals, positive indexed OFF.



PILLAR CASINGS

CAST IRON OR STEEL

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LARGE AND SMALL

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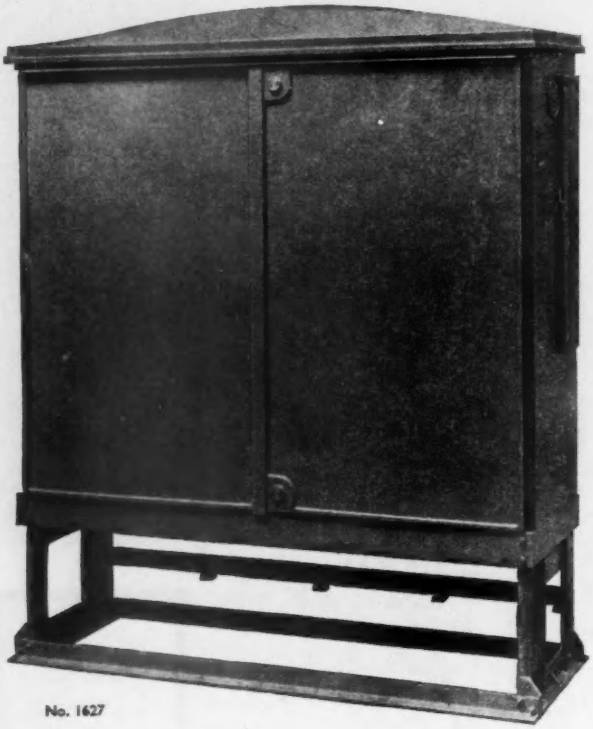
MANY STANDARD SIZES

No. 1609

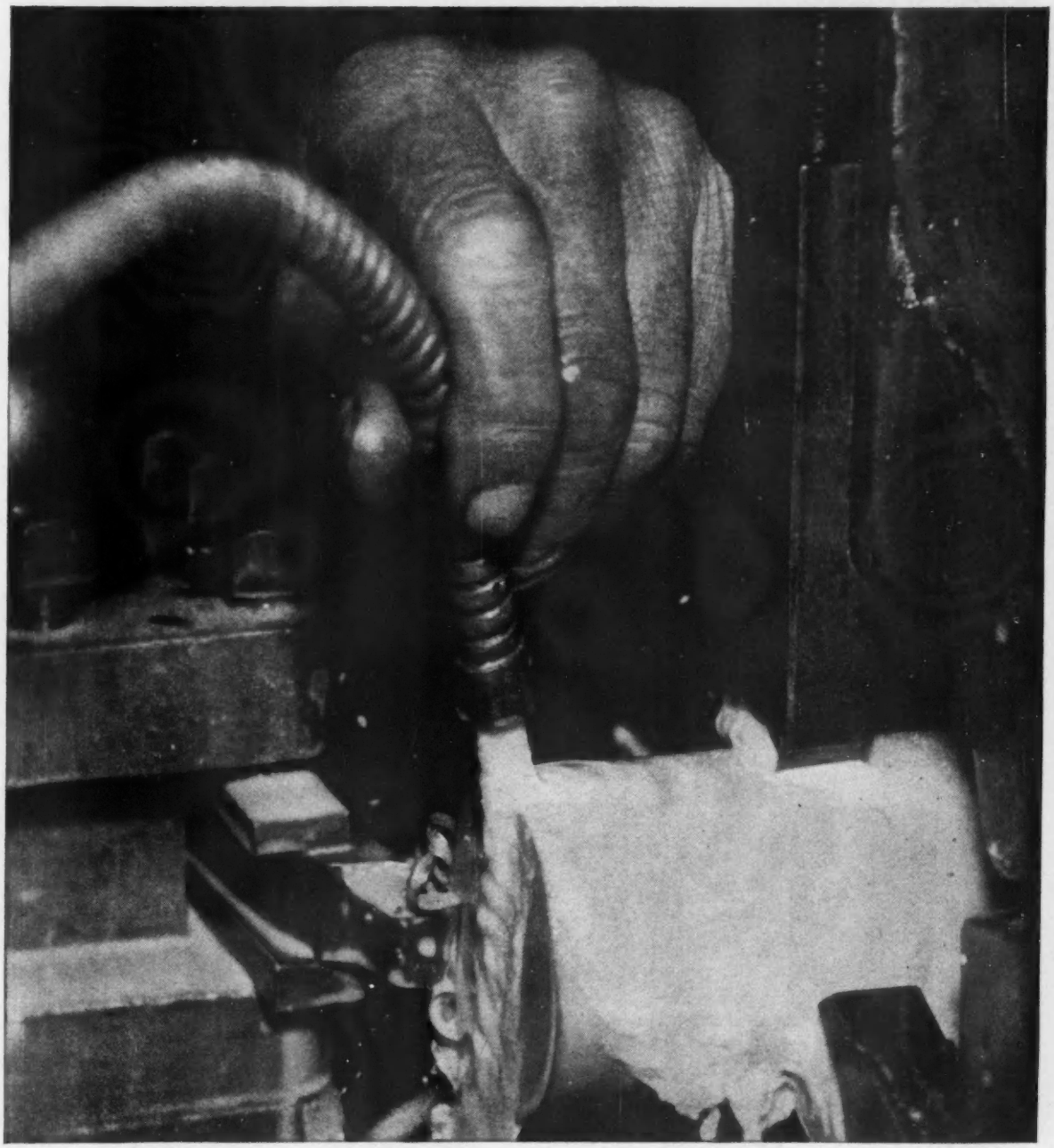


No. 1627

HARDY & PADMORE LTD., WORCESTER. *Tel.: WORCESTER 3215*

M.W.128

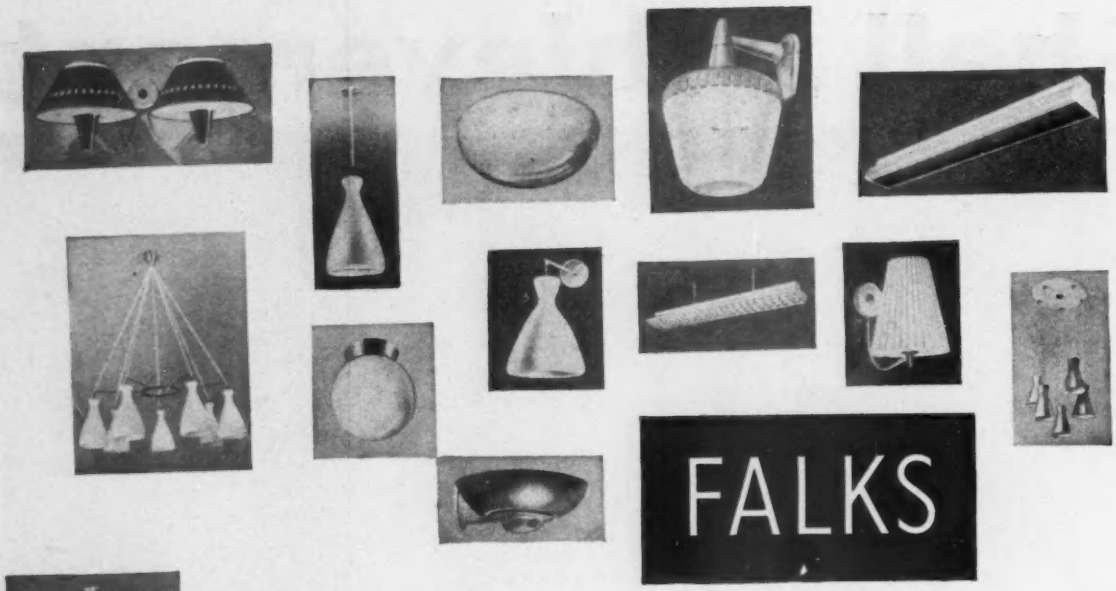
Shell achievement



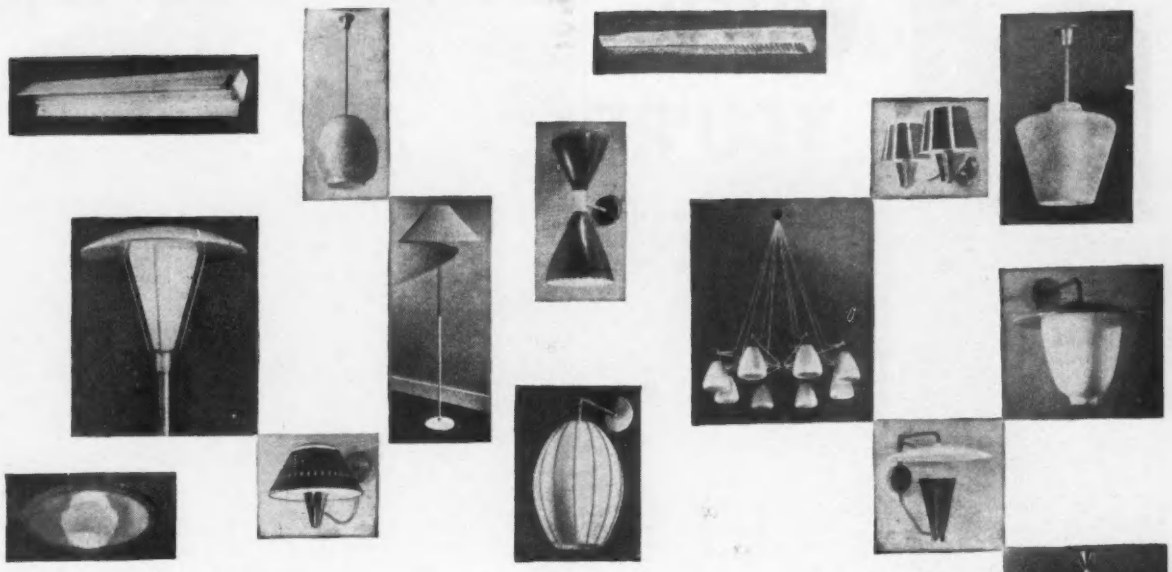
One of Shell's recent achievements in Industrial Lubrication has been to reduce the risk of skin trouble for machine operators. Until the new Shell Dromus range, most modern soluble cutting oils contained phenolic compounds, which can cause skin irritation. They were used as coupling agents between the actual oil and the emulsifier. On high-speed machines, especially, the water evaporates and the emulsion concentrates. And that's when the trouble can start. Shell scientists found a better coupling agent, and made it work. And now, at no extra cost, management can reduce working risks for their staff. *Write for the booklet 'Selecting Your Cutting Oils' to Shell-Mex House, London.*

SHELL

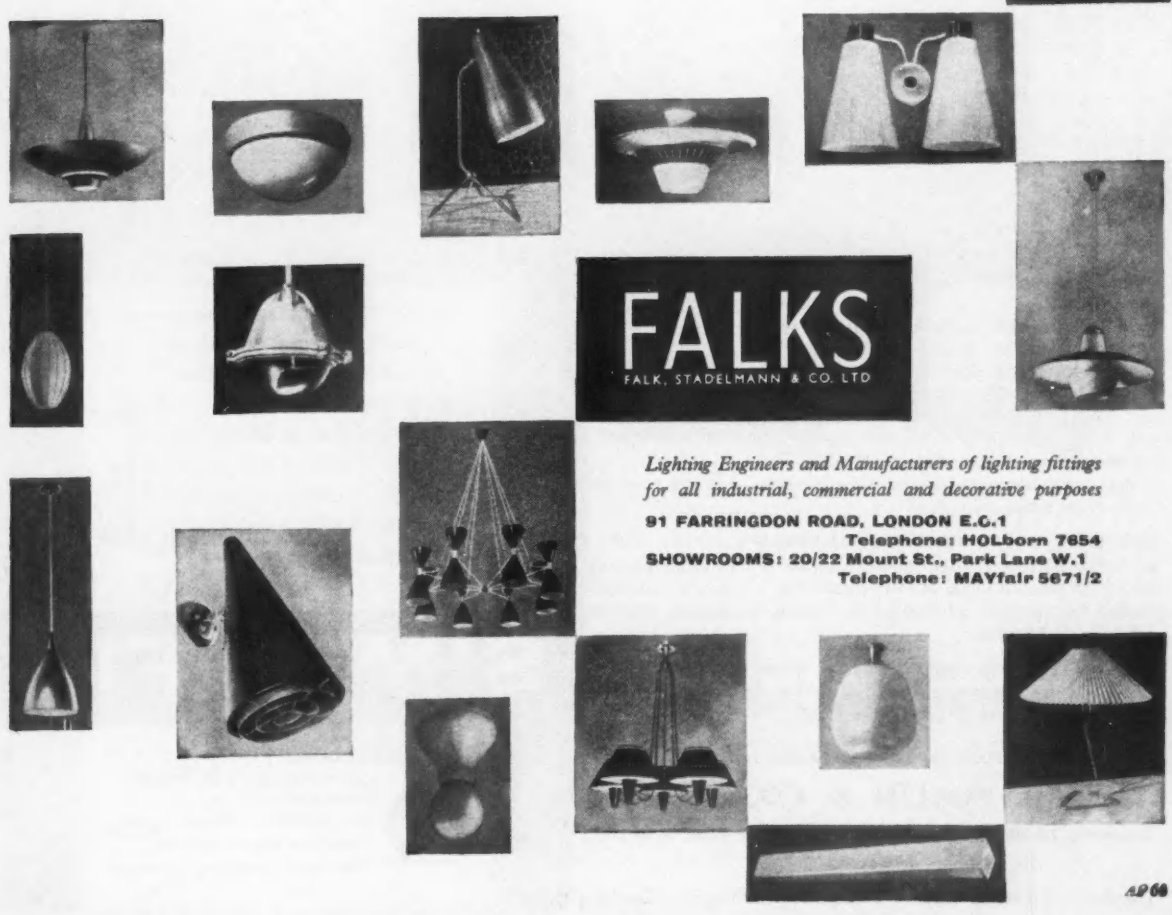
SHELL INDUSTRIAL OILS



for every requirement in lighting fittings . . .



. . . industrial . . . commercial . . . domestic



FALKS

FALK, STADELMANN & CO. LTD

Lighting Engineers and Manufacturers of lighting fittings for all industrial, commercial and decorative purposes

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SHOWROOMS: 20/22 Mount St., Park Lane W.1
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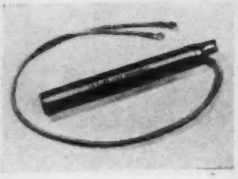
AP 66

WHEN YOU'RE CALLED IN . . .

For advice on efficient heating or cooling controls you're bound to recommend

Precision

PULLIN THERMOSTATS



FLOOR LIMIT THERMOSTAT (L4) has been specially developed to control under-floor heating installations to an accuracy of plus or minus one degree. It is a precision instrument, sealed against dust and moisture, and is used in conjunction with the Pullin A2 Room Thermostat. Once set and installed, it usually requires no further attention.

ROOM THERMOSTATS AND REVERSE ACTION THERMOSTATS.
Two models available—the A2/W and A2/WNL. Precision built to critical specifications and designed to control electric under-floor heating, storage heaters, tubular heaters, warm air systems, etc. Reverse action Thermostats, models A2/RA and A2/RANL, have a proven record after extensive testing. Designed to meet the demand for cooling applications in industry and agriculture, they are accurate to the finest limits.

YOU WILL ALSO WANT INFORMATION
on further additions to the wonderful range as they are developed during the year—a range of instruments that will provide accurate control for all types of heating or cooling equipment, whether industrial or domestic.

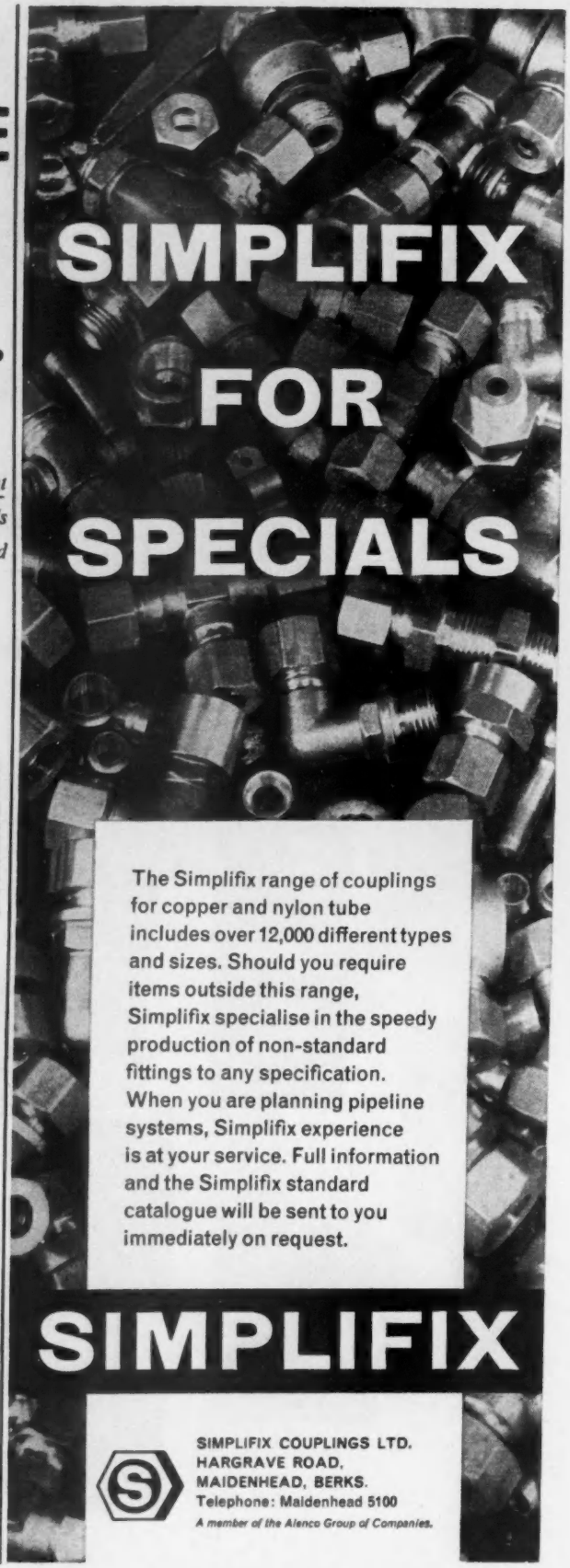
THINK OF PRECISION THERMOSTATS — THINK OF R. B. PULLIN
The A2 Thermostat has been selected by The Council of Industrial Design for exhibition in The Design Centre.

Write for Technical Leaflets to

R. B. PULLIN & CO. LTD.

Thermostat Division, Phoenix Works, Great West Road, Brentford, Middlesex

Telephone: ISLeworth 1212. Cables: Pullinco Wesphone London.



SIMPLIFIX FOR SPECIALS

The Simplifix range of couplings for copper and nylon tube includes over 12,000 different types and sizes. Should you require items outside this range, Simplifix specialise in the speedy production of non-standard fittings to any specification. When you are planning pipeline systems, Simplifix experience is at your service. Full information and the Simplifix standard catalogue will be sent to you immediately on request.

SIMPLIFIX

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MAIDENHEAD, BERKS.
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Your orders don't lie on our desks—they get immediate attention.
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STABLE PRICE OF ALUMINIUM
STRUCTURAL STABILITY
MOISTURE-PROOF
IMMUNITY TO INTERNAL SHORTING
RAPID HEAT DISSIPATION
USUALLY CHEAPER

VENESTA FOILS LTD

Put foil's top team to work for you!

Aluminium foil electrical coils, of almost any length and width, are an important new development in the electrical industry. Foil, with a thermo-setting insulating coating on one side, is wound into a reel like a roll of adhesive tape. The coils are then stoved to set the insulation. The result is a structurally stable block with no need for cheeks or formers, and immune to moisture and corrosion. Extreme accuracy—guaranteed to ± 0.002 in.—can be obtained by machining the coils on a lathe, while mild etching eliminates short circuiting. The difference in conductivity between copper wire and aluminium foil is offset by the better space factor of the rectangular section. There are no voids between the turns so heat diffuses evenly from turn to turn and from the middle to the ends, abolishing 'hot spots': the coils are thus tolerant of high temperatures and are easily cooled by fan or water. Low P.D. between adjacent turns makes foil coils inherently safe from internal shorting.

WE OFFER YOU full technical advice and finished coils, or coated foil for your own winding

WRITE OR 'PHONE FOR ONE OF OUR STAFF TO VISIT YOU.
VENESTA FOILS LTD., THORN HOUSE, UPPER ST. MARTIN'S LANE, LONDON W.C.2. TEL: TEMPLE BAR 4399

NEWS SHEET

N. Scotland HEB afflicted by dry weather in 1960, but make surplus. Internal sales 12·7% up, record appliance sales. Board has 572 MW plant under construction, further 555 MW proposed. (339)

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Unit built cookers, double ovens, rotisseries, featured in new cooker designs released this week. Combination of increased oven capacity, thermostatic hotplates in designs for small and large kitchens. (319, 325)

PEOPLE—A. M. Scales becomes Atlas Lighting marketing manager . . . L. J. Brown and H. D. Walker join J and P board . . . D. McC. Pullon to be O and M officer, E. Midlands EB . . . W. D. Sinclair becomes manager, AEI's new Power Rectifier Engrg Dept . . . G. M. Holland to be Northmet sub-area engineer, Eastern EB and C. C. Brazier Norfolk sub-area engineer . . . Electrolux nominate M. Gomme sales manager for Dishmaid . . . H. W. Thompson joins Philips to manage Domestic Appliance Div . . . E. Ledgard to be SeeBoard's Woking district manager . . . E. A. Fowler relinquishes managing directorship GEC Domestic Equipment Group . . . R. H. Phillips joins Pirelli-General Cable Works' board . . . H. A. P. Caddell to be manager-designate of MEB's combined S. Staffs and N. Worcs sub-area and D. Holt will meanwhile act as sub-area manager . . . R. H. Rockliffe to succeed A. C. MacQueen (retiring) as Birmingham area engineer, MEB . . . J. C. Robertson becomes J.P. sales manager (home) . . . H. F. Bibby now general manager AEI Export Ltd . . . P. Jardine appointed managing director, J. G. Statter. (334, 337)

WHY FOIL FOR COILS?
STABLE PRICE OF ALUMINIUM
STRUCTURAL STABILITY
MOISTURE-PROOF
IMMUNITY TO INTERNAL SHORTING
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NEWS SHEET

30% greater heat dissipation through stressed oil possible compared with no-stress condition, suggests article on influence of voltage stress on heat transfer. May account for better cooling of transformers than indicated by l.v. copper loss tests; could be exploited in design. (321)

CEGB to open Berkeley nuclear labs in May, Leatherhead electro-technical labs later in year; tentative plan for third lab at Marchwood station. (320, 345)

December drop in sales of major appliances (except immersion heaters) by area boards. Biggest decline (47·8) by washing machines, clothes dryers 36·3% down and refrigerators 21·5%. (345)

More financial and organisational aid for overseas fairs; BoT favour specialised trade fair as of best value to British industry, but will help with prestige pavilions at other types. (348)

January CEGB units sold 13·3% up on last year. Total units for UK were 13,250 during month. Rugeley first 120 MW set in service. (344)

Consulting engineers face competition from continental practitioners, says ACE president. To meet this in overseas markets, consulting engineers need more employment at home. (349)

Record for January electrical exports, valued at £27,119,101. Largest increases in heavy plant. Imports topped £5¼ million. (343)

Million-million increase in efficiency needed for nuclear fusion before it is a power reality, physicist tells I.Mech.E., reviewing present status of thermo-nuclear research. (320, 338)

Electricity supply will take 66·5m. tons of coal in 1970-71, says C. T. Melling. Electricity taking 94% of its needs as untreated-smalls. Off-peak floor warming now 600 MW, storage heaters 500 MW, installed. (346)

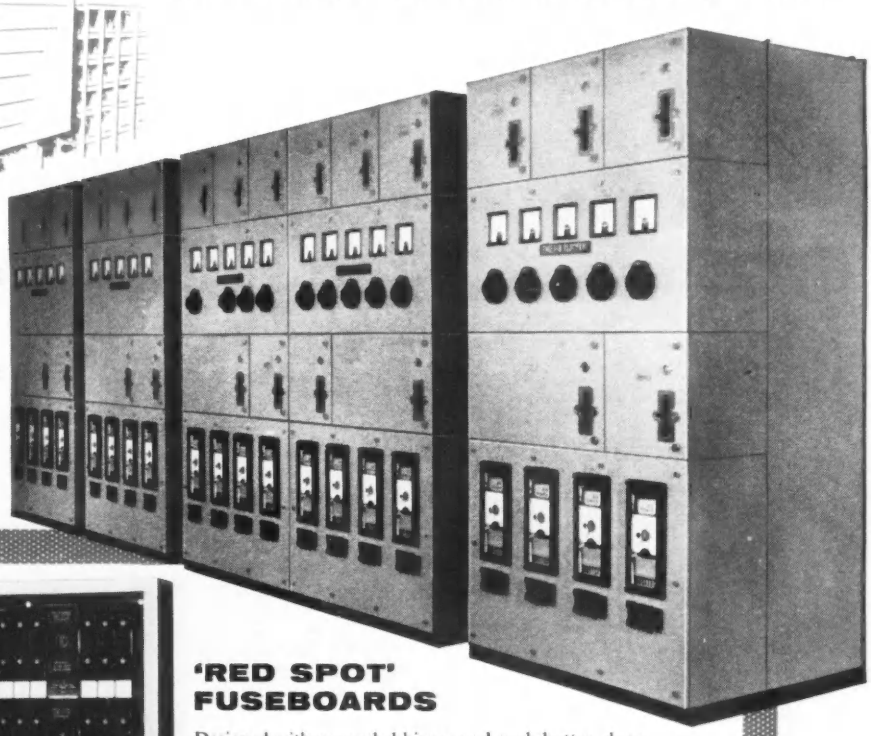
BUSINESS—Philips to invade UK major domestic appliance market in 1962 . . . Ocean Trust acquire interest in A. J. Flatley (345) . . . Controls Co. of America forms UK subsidiary . . . Elliott-Automation and Litton Industries Inc., form £400,000 microwave valve concern (346) . . . MEM maintains profit at over £490,000 . . . International Combustion report fewer orders, and Clarke Chapman's profit dips . . . With new subsidiaries Ether Langham Thompson profit is over £110,000 . . . Gas Purification pass interim but anticipate improved profits (350) . . . GEC make offer for Radio and Allied Holdings. (348)

OVERSEAS—Price fixing denied in Canada . . . Sweden uses plastics for dam protection . . . $30m. loan by World Bank for Yugoslav hydro scheme open to world tender . . . Colombia may build 500 MW hydro station . . . USSR to loan £45m. to India for second Bhakra station. (351)

FOR MODERN BUILDINGS

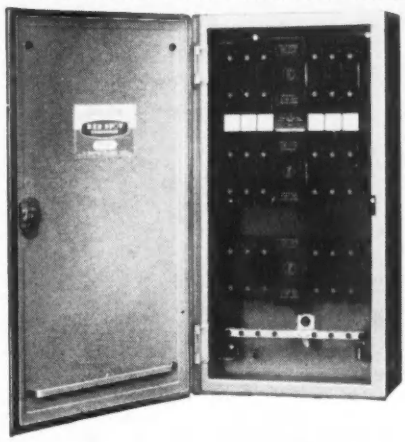
The continual increase in the use of electric power consuming devices in all types of buildings calls for well designed distribution equipment of proved performance. 'ENGLISH ELECTRIC' meet these requirements with their 'Superform' Switchboards and 'Red Spot' Fuseboards.

EASY TO INSTALL • EASY TO MAINTAIN
SAFE TO OPERATE • OF PLEASING APPEARANCE



'SUPERFORM' SWITCHBOARDS

These switchboards have all the 'live' metal insulated, including busbars, interconnections, cable terminations, instrument and meter terminals, switch contacts and terminal blocks. Thus spare switches included on the switchboard can be cabled up safely with the existing circuits in operation.



'RED SPOT' FUSEBOARDS

Designed with concealed hinges and push button door catch having provision for locking by means of a built-in cylinder lock, 'Red Spot' fuseboards have the busbars and incoming cable sockets fully insulated. The fuse contacts and fuse terminals are covered by insulated shrouds. These features provide safety to electrical personnel by enabling spare fuseways to be cabled up with the busbars alive.

'ENGLISH ELECTRIC'

fusegear

FOR DESCRIPTIVE LITERATURE WRITE TO:

The English Electric Company Limited,
Fusegear Division,
East Lancashire Road, Liverpool, 10

THE ENGLISH ELECTRIC COMPANY LIMITED, ENGLISH ELECTRIC HOUSE, STRAND, LONDON, W.C.2
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FG.58

NEWS SHEET

30% greater heat dissipation through stressed oil possible compared with no-stress condition, suggests article on influence of voltage stress on heat transfer. May account for better cooling of transformers than indicated by l.v. copper loss tests; could be exploited in design. (321)

CEGB to open Berkeley nuclear labs in May, Leatherhead electro-technical labs later in year; tentative plan for third lab at Marchwood station. (320, 345)

December drop in sales of major appliances (except immersion heaters) by area boards. Biggest decline (47·8) by washing machines, clothes dryers 36·3% down and refrigerators 21·5%. (345)

More financial and organisational aid for overseas fairs; BoT favour specialised trade fair as of best value to British industry, but will help with prestige pavilions at other types. (348)

January CEGB units sold 13·3% up on last year. Total units for UK were 13,250 during month. Rugeley first 120 MW set in service. (344)

Consulting engineers face competition from continental practitioners, says ACE president. To meet this in overseas markets, consulting engineers need more employment at home. (349)

Record for January electrical exports, valued at £27,119,101. Largest increases in heavy plant. Imports topped £5½ million. (343)

Million-million increase in efficiency needed for nuclear fusion before it is a power reality, physicist tells I.Mech.E., reviewing present status of thermo-nuclear research. (320, 338)

Electricity supply will take 66·5m. tons of coal in 1970-71, says C. T. Melling. Electricity taking 94% of its needs as untreated-smalls. Off-peak floor warming now 600 MW, storage heaters 500 MW, installed. (346)

BUSINESS—Philips to invade UK major domestic appliance market in 1962 . . . Ocean Trust acquire interest in A. J. Flatley (345) . . . Controls Co. of America forms UK subsidiary . . . Elliott-Automation and Litton Industries Inc., form £400,000 microwave valve concern (346) . . . MEM maintains profit at over £490,000 . . . International Combustion report fewer orders, and Clarke Chapman's profit dips . . . With new subsidiaries Ether Langham Thompson profit is over £110,000 . . . Gas Purification pass interim but anticipate improved profits (350) . . . GEC make offer for Radio and Allied Holdings. (348)

OVERSEAS—Price fixing denied in Canada . . . Sweden uses plastics for dam protection . . . $30m. loan by World Bank for Yugoslav hydro scheme open to world tender . . . Colombia may build 500 MW hydro station . . . USSR to loan £45m. to India for second Bhakra station. (351)

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The continual increase in the use of electric power consuming devices in all types of buildings calls for well designed distribution equipment of proved performance. 'ENGLISH ELECTRIC' meet these requirements with their 'Superform' Switchboards and 'Red Spot' Fuseboards.

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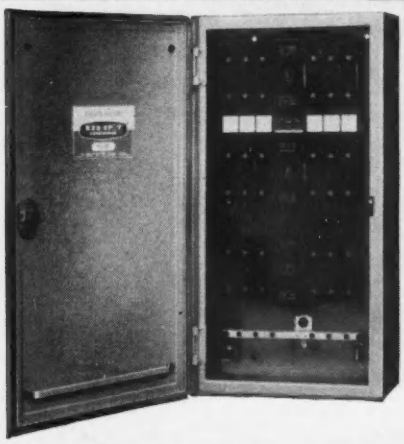
These switchboards have all the 'live' metal insulated, including busbars, interconnections, cable terminations, instrument and meter terminals, switch contacts and terminal blocks. Thus spare switches included on the switchboard can be cabled up safely with the existing circuits in operation.



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Designed with concealed hinges and push button door catch having provision for locking by means of a built-in cylinder lock, 'Red Spot' fuseboards have the busbars and incoming cable sockets fully insulated. The fuse contacts and fuse terminals are covered by insulated shrouds. These features provide safety to electrical personnel by enabling spare fuseways to be cabled up with the busbars alive.

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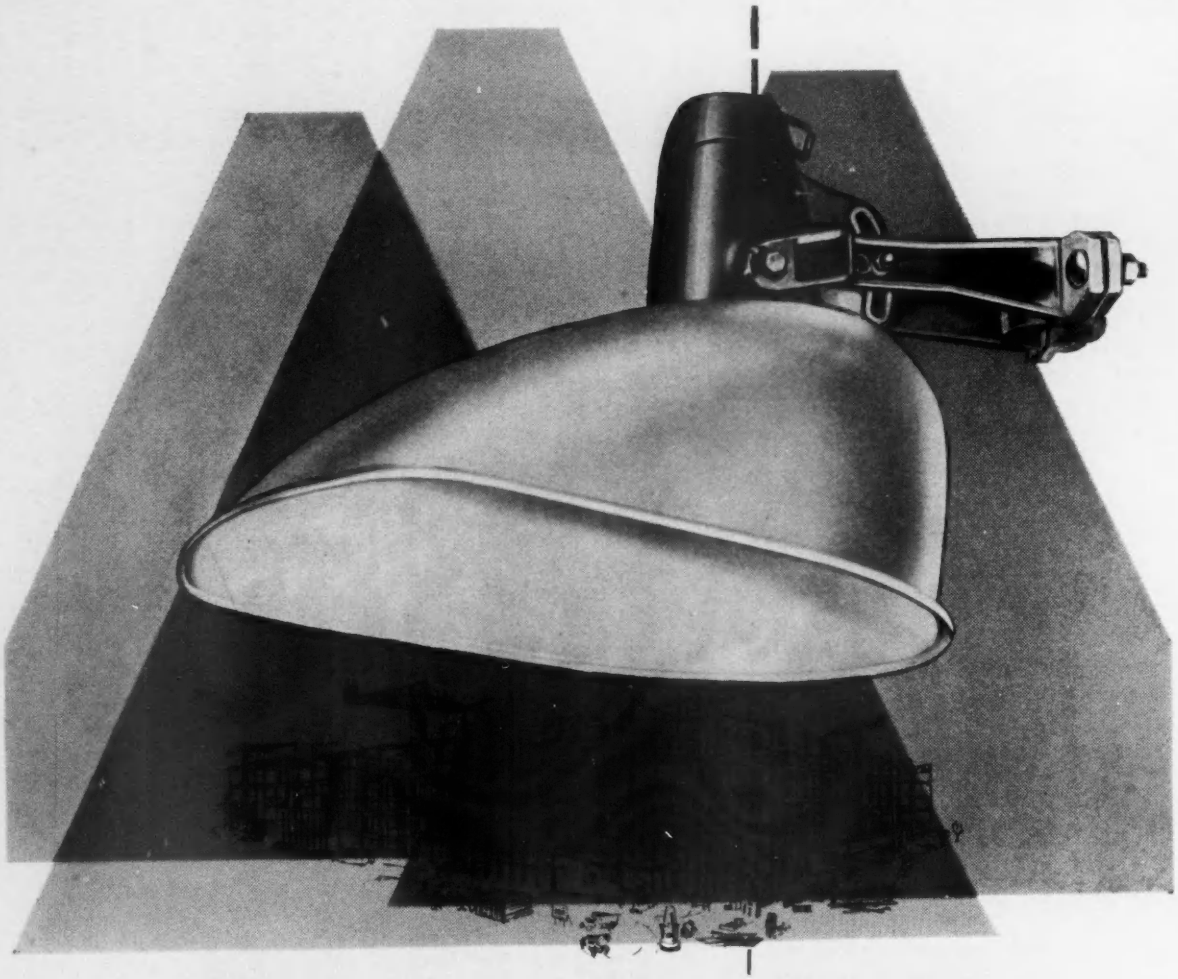

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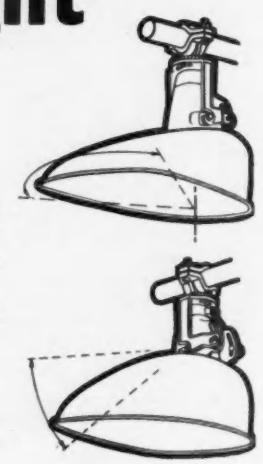
The Simplex Junior Reflecto Flood is suitable for 300/1500W GLS or 250/1000W Mercury discharge lamps and is available in red, yellow, blue, grey or white.
Price from £10 10 0 complete in carton with bracket.



The Simplex reflector can be adjusted to the required angle.

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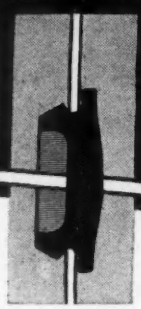
THE DOUBLE SEALING EMPIRE RUBBER GROMMET

infinitely accommodating in use:
considerably reduces range of sizes
because the same grommet can be used with
several plate thicknesses or cable sizes



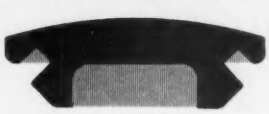
PAT. APP. No. 5255/59

This newly developed self-conforming grommet, because it is immediately self-locking against the elements, is the solution to many of an engineer's sealing problems.

Any one size will not only accommodate itself to a variety of mounting plate thicknesses, but (designed for cable or control rod) will take these in a variety of sizes and be weather-, water- and dust-proof at a variety of angles to the cable or rod.

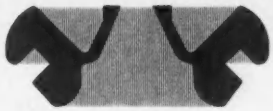
Because of its capacity to conform to many varying requirements, it enables a workshop stock range of grommets to be reduced to perhaps one tenth of that at present maintained.

THE NEW BLIND GROMMET



FREE

THE NEW DESIGNED GROMMET



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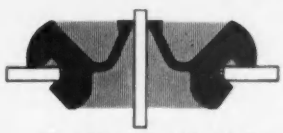
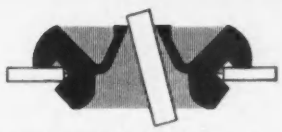
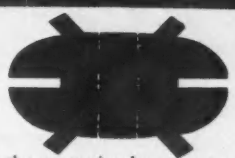
Note how when sprung into position the grommet provides a perfect double seal by its own permanent pressures. The angled groove also creates a tight pressure hold on the metal plate.

In the cable grommet variety the same double pressure seal is created, allied to tight seal on various diameters of cable. This new grommet gives sound sealing at *all* vital points.





A useful feature of this cable grommet is that by reason of the designed taper of the cable entry and the flexibility of the web, a considerable angle of cable entry and a variety of cable size are possible. This avoids necessity for special grommets with angled bores.



In the conventional grommet, only one thickness of plate and only one size of cable can be accommodated. No effective seal is afforded by the parallel groove.

Now being produced in a range of sizes.

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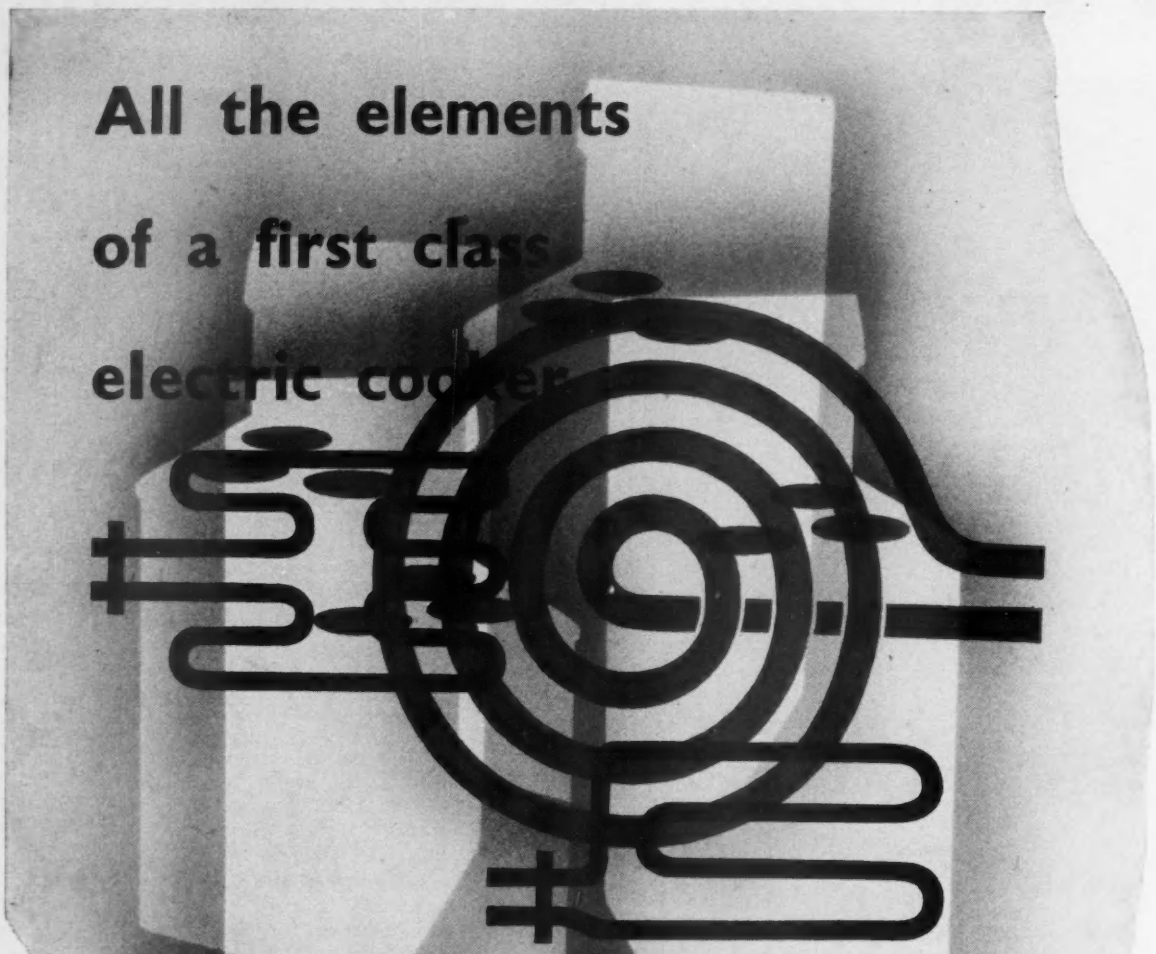

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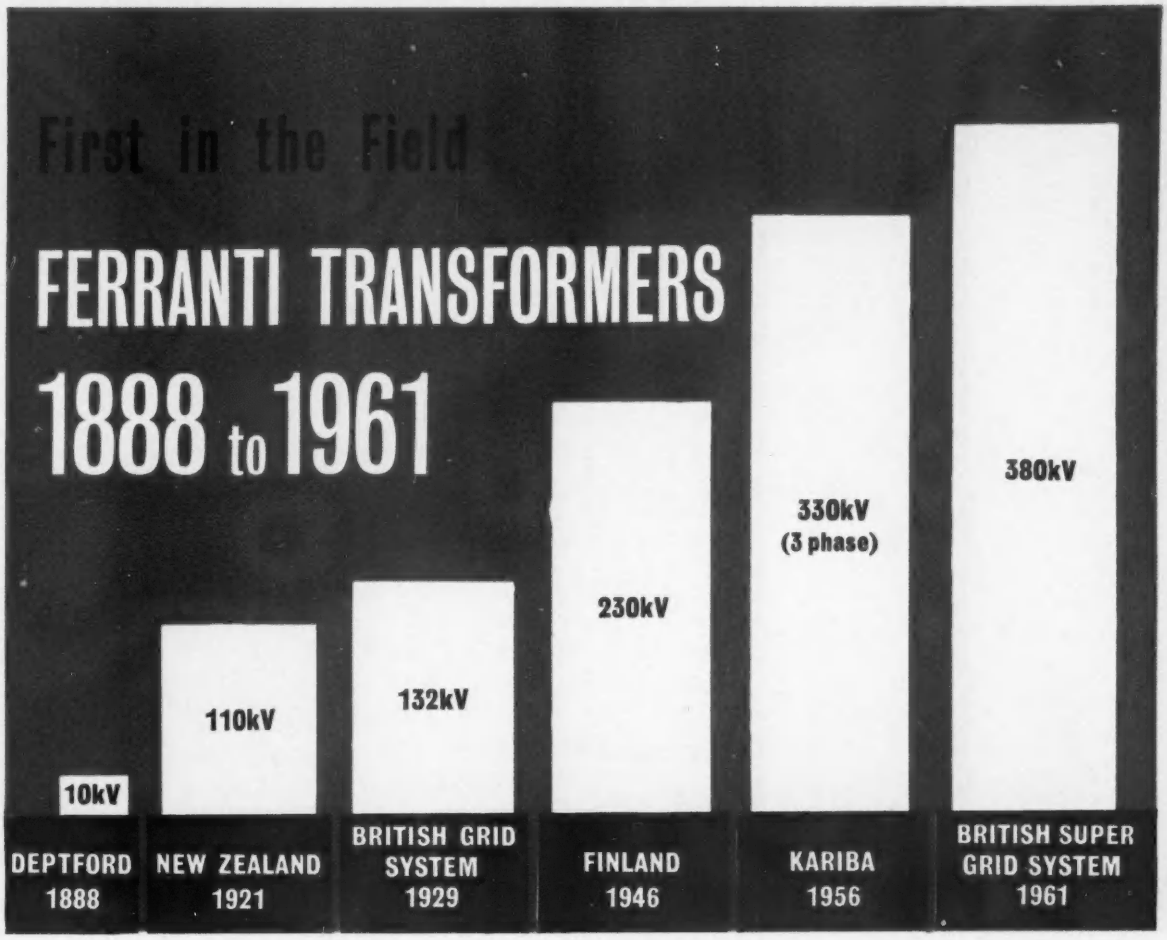

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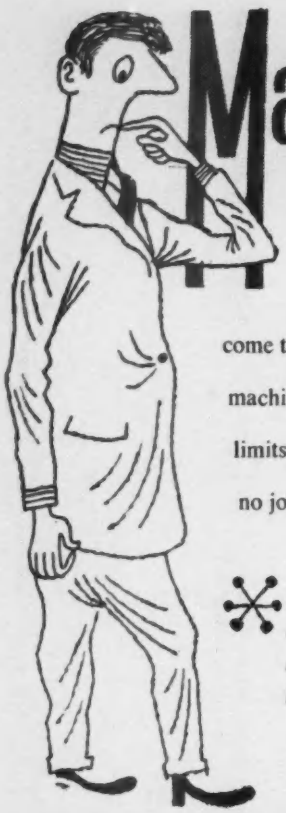

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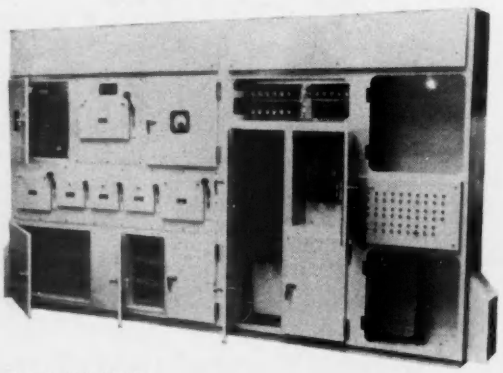

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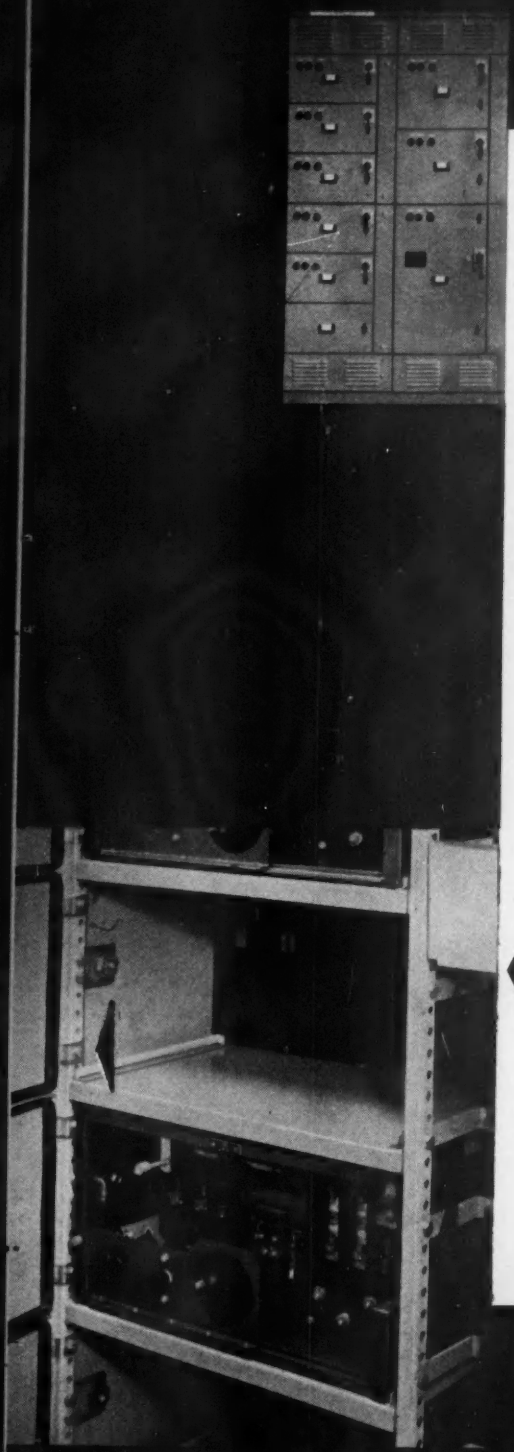

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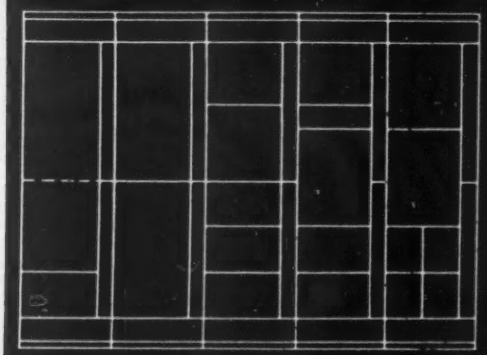
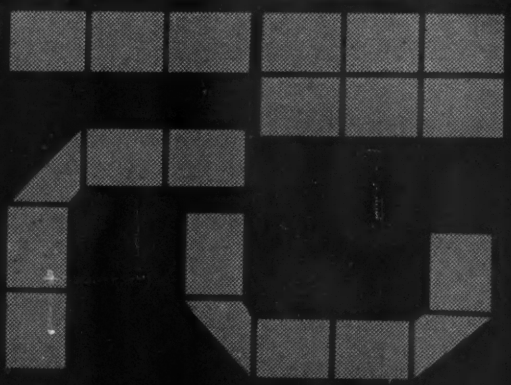
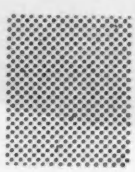




G.E.C.

WHY INDUSTRY IS CHANGING TO CLASS C AND CLASS H TRANSFORMERS

THEY ARE FAR BETTER



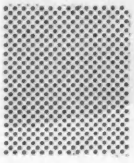
Class C & Class H *silicone-insulated, dry-type transformers are fire and explosion proof. They are not affected by dust and humidity. And because they will withstand repeated overloading, rating does not have to be based on peak loads. For safety, reliability and low maintenance costs, silicone-insulated transformers hold every advantage.*

THEY ARE OFTEN CHEAPER

First consider all the expenditure incumbent upon the installation of oil-filled transformers. Special bunkers and fireproof vaults are usually needed—and special fire-fighting equipment. The installation is often located a considerable distance from the load centre—which implies expensive low-voltage cable runs.

Now consider the very considerable cost-cutting advantages of Class C and Class H transformers as demonstrated for instance at the Kent factory of Medway Paper Sacks Ltd, a member of the Reed Paper Group. Here a 750 kVA 3-phase air natural cooled transformer, built by Ferranti Ltd, has been neatly mounted within the roof truss space. Space limitations—making it undesirable to build an adjoining substation for a Class A unit—together, of course, with freedom from fire hazard, were the major considerations. As a Group technician pointed out, the transformer's low weight enabled it to be sited thus, on a moderately-sized platform, making it possible to run 'a very nice low voltage distribution' to individual machines without floor excavations to accommodate long, costly cable runs.
And so, in simple indisputable terms, it often costs less to have all the advantages of a Class C or a Class H installation.

Midland Silicones Ltd supply the silicone resins and elastomers used in the manufacture of Class C and Class H transformers. Here is a list of well-known British manufacturers producing silicone-insulated dry-type transformers for the United Kingdom and overseas.



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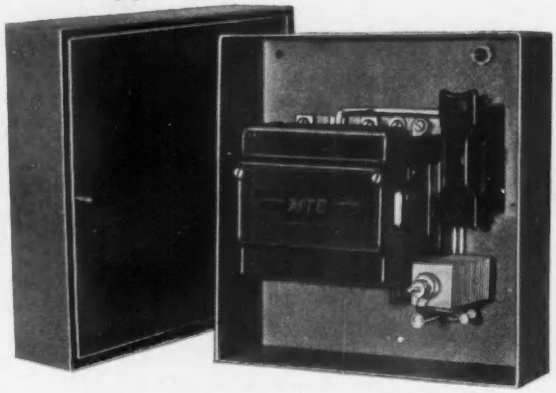

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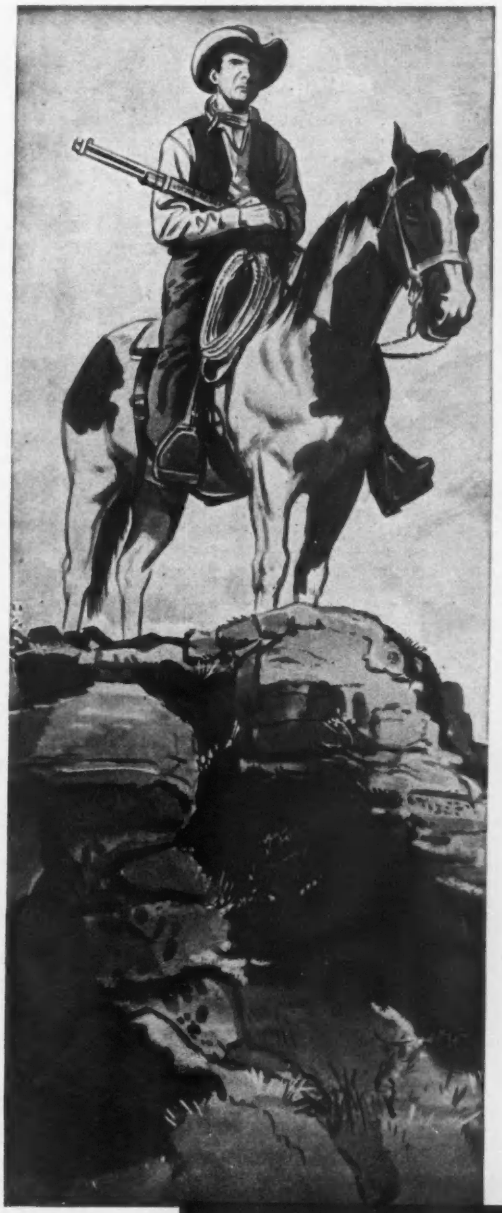

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ELECTRICAL TIMES

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Dans ce numéro

Transfert de chaleur par effort électrique 321

Le transfert de chaleur au travers de l'huile d'isolement augmente en fonction de l'effort électrique. Dans les conditions d'usage commercial courantes, l'élévation de température enregistrée dans les transformateurs et appareils de distribution à refroidissement par l'huile peut être inférieure de 5% aux valeurs mesurées à basse tension, comme dans les essais de pertes dans le cuivre auxquels sont soumis les transformateurs. On peut bénéficier des facteurs thermiques en question dans la conception de divers appareils thermiques à haute tension. Une réduction maxima de 30% de l'élévation de température devient alors théoriquement possible avec des efforts de l'ordre de 200 V/mm.

Avenir des appareils électriques ménagers 323

L'organisation des ventes a été traitée dans trois rapports différents lors d'une conférence d'agents des services de ventes de l'industrie électrique. Les étalages de salles de ventes exigent une technique moderne avec vitrines ouvertes à l'arrière et éclairage de l'ordre de 1.076 lux. Il ne serait plus nécessaire de prévoir des facilités pour la démonstration des appareils. Il est important que les installations électriques ménagères soient adéquates; le raccordement des divers circuits à une minuterie centrale répond aux besoins actuels. Du point de vue du fabricant, le marché des appareils ménagers est susceptible d'expansion.

Avenir de l'énergie thermo-nucléaire 338

Les recherches visant à développer les possibilités économiques de l'énergie de fusion thermonucléaire tendent, au premier chef, à réaliser un dispositif capable de produire des neutrons provenant presque uniquement de réactions de fusion, sans que ces neutrons soient dilués par ceux provenant des ions directement accélérés. On n'est pas encore arrivé à un tel résultat. Avant qu'un réacteur de fusion puisse fournir davantage d'énergie qu'il n'en consomme pour son propre fonctionnement, il faudre améliorer dans la proportion de 10^{14} le rendement des meilleurs réacteurs expérimentaux de ce type réalisés jusqu'ici.

In dieser Nummer

Wärmeübertragung bei elektrischer Belastung ... 321

Die Wärmeübertragung über Isolieröl wächst mit der elektrischen Belastung. Der Temperaturanstieg in ölgekühlten Transformatoren und Schaltvorrichtungen ist bei üblicher Belastung u.U. um 5% geringer als die bei Niederspannung gemessenen Werte, wie sie z.B. bei Versuchen betreffend Kupferverluste im Transformator zu Tage treten. Diese thermischen Bedingungen können nutzbringend bei der Konstruktion gewisser Hochspannungsgeräte ausgenützt werden, wo bei Belastungen von 200 V/mm eine maximale Herabminderung des Temperaturanstiegs von 30% theoretisch durchaus möglich ist.

Die Zukunft von elektrischen Haushaltsgeräten ... 323

Auf einer Konferenz von Verkaufsstäben der elektrischen Kraftversorgungsindustrie wird die Absatzförderung in drei Vorträgen einer eingehenden Untersuchung unterzogen. Die Schaustellung in den Ausstellungsräumen erfordert moderne Werbemethoden unter Verwendung rückwärtig offener Auslagen und einer Beleuchtung von 1076 lux Stärke. Die Bereitstellung von Vorführmöglichkeiten wird heute nicht mehr für nötig gehalten. Hinreichende Versorgung des Heims mit hochqualitativen elektrischen Einrichtungen ist ein wichtiger Faktor und ein Mittel zur Befriedigung derzeitiger Ansprüche ist die Verwendung von an einen zentralen Zeitschalter angeschlossenen Stromkreisen. Vom Standpunkt des Herstellers ist der Markt für Haushaltsgeräte weiter ausdehnungsfähig.

Die Zukunft der thermonuklearen Krafterzeugung ... 338

Das unmittelbare Erfordernis bei der auf die wirtschaftliche Anwendbarkeit thermonuklearer (Fusions-) Krafterzeugung abzielenden Forschungsarbeit ist die Erstellung einer Vorrichtung, mit der sich fast ausschliesslich von Fusionsreaktionen herrührende Neutronen ohne Verdünnung durch von direct beschleunigten Ionen erzeugt Neutronen erzielen lassen. Bis jetzt war dies noch nicht möglich. Eine 10^{14} mal gesteigerte Leistung des bisher besten Kernverschmelzungs-Versuchsreaktors wäre erforderlich, damit der Betrag an erzeugter Kraft den zum Betrieb nötigen Kraftverbrauch übersteigen kann.

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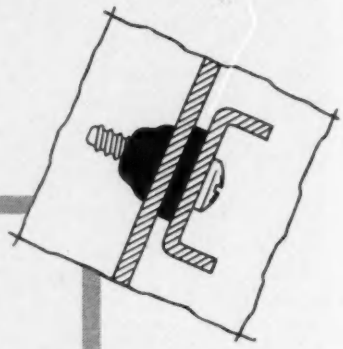

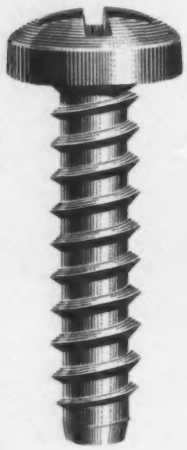

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ELECTRICAL TIMES

ESTABLISHED 1891

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Comment

MORE TALKS ON ADEQUATE WIRING

Any paper on adequate wiring of domestic premises is welcome these days. At the EDA Sales Conference, a NWEB sub-area commercial officer tackles the problem. He presents a survey of broadly agreed standards, and some forward-looking ideas such as extended use of time-switches as part of the general installation, and a drive for a socket-outlet rated for more than 3 kW. All interesting—but when is something really forceful going to be done? The situation in the UK contrasts strongly with the North American scene, where a system of design endorsements by the private-enterprise supply authorities is pushed at builders to persuade them to include in new dwellings not only reasonable socket-outlet provision, but also a selection of permanently connected major appliances. The scheme has wider existence in the USA and Canada than the author of the EDA paper suggests; and it seems to attain some success. Its distinguishing points are that it offers builders something of cash value—a prize for meeting the specification, and a displayable endorsement of one feature of their home design that helps clinch the deal with a prospective purchaser. Is there any reason why British schemes should not meet these criteria? The cash might be a problem, but if the clear standard for adequacy of provision which we have advocated in these columns were drawn up with the co-operation of all the industry—not just the boards—then the public selling value could be provided. The time is ripe, too, with the popular support for marks of approval and the like. But it will take a concerted drive to get action, and so far there has been little but good intentions—hardly enough to aspire even to the proverbial category of paving stones.

COOKERS HOT UP

Cooker designers have done the industry proud this year. Never have there been such a collection of new models to be seen at the salon of cookers held in advance of the three spring exhibitions. Some of the new lines have clearly been influenced by the luxury cookers that are now being imported from North America, but the ideas have been anglicised and softened to the more limited purses in this country. Unit cookers, with the wall mounting oven and separate hob for built-in kitchens, are now available for those who have the room for planned kitchens; they may lack the lushness of some more advanced North American designs that have been introduced, but prices have been kept within reason. With broiler conveyor belts still accelerating, the rotisserie looks like becoming a popular feature, and a particularly British twist is to convert the eye-level grill to an eye-level rotisserie,

which has obvious visual attractions over the original oven-hidden devices. Two-oven cookers are now down to the £70 mark and thermostatically controlled hotplates working on the temperature of the pan are gradually moving down from the luxury to the middle-price range. This new surge forward in cooker design is most refreshing; whether it stems from overseas competition, from the greater stability of the cooker market, or perhaps even indirectly from the activities of the Cooker Promotional Committee, it is a worthwhile result. We hope it is infectious. Washing machines are also showing some signs of liveliness, but other sections of the appliance industry are much in need of the enthusiasm and drive which is manifest amongst cookers.

SUPPLY RESEARCH

The supply industry has been heavily criticised in the past for not undertaking enough research. Since the 1957 reorganisation, the research and development activities of the CEGB, at least, have multiplied rapidly and, at the end of May, the first formal bricks and mortar sign of this will come with the opening of the Berkeley nuclear research laboratories. This is the first of what may be a trinity of laboratories in which experimental work will be concentrated. Still to come are the electro-technical laboratories, giving much-increased facilities at Leatherhead, where supply industry research has had a foothold for many years, and a possible conventional generation research establishment near Marchwood power station, at present only a tentative proposal. There are problems enough and to spare awaiting these laboratories and the extensive headquarters staff at Friars House. Deciding which shall be tackled is a major difficulty in itself for the research administration. This is represented most starkly by the choice between spending money on improving amenity (finding a way of doing something in a more elegant manner) and on improving efficiency (finding a way of saving money). Inevitably, there must be hope of some spectacular successes during the next few years, for only that will stifle criticism of the heavy spending involved from those who do not appreciate the steady improvement that applied scientific effort can make to a technical industry. And in all this generation effort the position of the distribution side of the industry must not be overlooked. Its research lacks central drive—when will the Electricity Council appoint their research adviser?—but it is quite extensive in some boards, quietly producing worthwhile results.

THE PROFESSIONAL ENGINEER

For the second year running, the main theme in the presidential speech at the IEE annual dinner was domestic. It tackled the question of enhancing the public standing of the professional engineer not only from the aspect of status and influence being obtained, but, more fundamentally, from the consideration that only thus can engineering stand a chance of recruiting its needed share of the best of the country's youngsters. Sir Hamish MacLaren favours a "super-institution" as the answer, a common roll of all chartered engineers of whatever specialist persuasion. This is a subtle approach that comes near statutory licensing, and thus official recognition, without grasping that particular nettle. Sir Hamish dislikes the thought of complete amalgamation, but in contrast argues that it is self-evidently undesirable for electrical engineers to seek (or continue to seek?) association in any fragmentary specialised body. It is certainly a good thing that these ideas should be voiced for public debate. It would be advantageous if some occasions other than the annual general meeting of the Institution could be found for the membership to chew them over. The same thought applies to the proposal, now publicly announced, to reorganise in some way the present four specialised sections of the Institution to make a more compact organisation. It is a tenable proposition, worth some consideration, that, as professional men, chartered electrical engineers ought to be encouraged to give more time and thought to the machinery of their corporate existence.

FUSION UP-TO-DATE

Thermonuclear power, the darling of the popular Press only three years ago when British achievements with ZETA looked at their brightest, is now thoroughly in the doldrums. In lecturing the Institution of Mechanical Engineers on the current status of development, Prof P. M. S. Blackett spoke revealingly of "an attitude of mild pessimism in many quarters." The position has changed little since 1958 because the crippling difficulties then revealed have not been overcome, and Prof Blackett underlines the problem ahead by sketching the scale on which progress must be made before power supply engineers need take a direct interest in thermonuclear generation. Speaking in broad approximations, he estimated as low as only one-millionth per cent, the energy efficiency of a machine that could be used to study the physics of a fusion reaction. No machine is yet as efficient as this, nor has any design approached the figure. So an improvement of the order 10^{12} in efficiency is needed before there is any return from fusion reactions, and what the additional increase would have to be to make the operation economic is anyone's guess. What is clear is that relatively small-scale work is the order of the day; apparatus with capital cost in the £50,000 region, with a team of four or five scientists and engineers exploiting it, rather than vast projects like the ill-fated ZETA. Such work may bring the clue that can permit a leap forward in the practicability of fusion power; but the leap has to be a giant's step before the mood of early promise can be revived.

Meteor

This week's quick summary of electrical news faces advertisement page 8

Heat transfer at high voltage

INCREASED COOLING BY OIL UNDER STRESS

by P. H. G. Allen,* B.Sc.(Eng.), Ph.D., A.K.C., A.M.I.Mech.E, A.M.I.E.E.

AMONG the phenomena investigated during the last 25 years has been the way in which electric stress affects heat transfer at surfaces. The effect is of little importance at low operating stresses, but when, for example, oil in transformers and switchgear is subjected to alternating stress above about 30 V (r.m.s.) per mil, the change in heat transfer becomes measurable. The exact effect of unidirectional (d.c.) and mixed (a.c. plus d.c.) stress is still not agreed,[1] but alternating stress at industrial frequency undoubtedly assists the transfer of heat to insulating oil. As an example, currently accepted working stresses in layer type power transformer windings can give a reduction of about 5% in temperature rise compared with the short-circuit test condition. While this may not seem a striking improvement, the effect increases rapidly with known parameters. This short article describes the data correlation method and recommends test techniques. The further improvement given by quite moderate stress increase is discussed. In heat exchanger practice, where stresses are not limited by possible overpotentials, a mixed stress has been shown to improve overall heat transfer performance by more than three times.[2]

Data Correlation

Green[3] has explained the use of the dimensionless groups Nu, Gr and Pr (Nusselt, Grashof and Prandtl numbers) in correlating convective heat transfer data. Due to the presence at the heat transfer surface of alternating stress E, the Nusselt number is increased by an amount $\triangle Nu$. Kronig and Shwartz[4] have shown that:

$$\triangle Nu = f(El,Pr) \quad .. \quad .. \quad .. \quad .. \quad .. \quad .. \quad (1)$$

which is exactly analogous with eqn.(2) of reference[3] with Gr replaced by El, the " characteristic electric number," defined:

$$El = (dK/d\theta)\theta L^2 E^2 \rho/\eta^2 \quad .. \quad .. \quad .. \quad .. \quad .. \quad (2)$$

Also:

$$Nu = HL/k\theta \quad .. \quad .. \quad .. \quad .. \quad .. \quad .. \quad .. \quad (3)$$

$$Pr = c\eta/k \quad .. \quad .. \quad .. \quad .. \quad .. \quad .. \quad .. \quad (4)$$

It has been found that log ($\triangle Nu$) plots linearly against log (El.Pr). For example, Fig. 1 gives mean curves for cylinders of a few mils diameter (L) and for gaps and ducts between 0·2 in. and 0·5 in. thickness (L). In each case, fluid properties are evaluated at the temperature of the heat transfer surface. The data are from several sources.[1,5,6] Fig. 2 is a graph for rapid calculation of El.Pr when using transformer oil as the heat transfer fluid.

Test Techniques

Changes in heat transfer conditions giving $\triangle Nu$, necessarily represent small differences between larger quantities. However, the error associated with such a calculation can be minimised by suitable test techniques. Generally speaking, accurate measurements can be best made using d.c. to provide the power dissipated as heat. For practical reasons, the heat source must be at earth potential, and so the high voltage insulation arrangements may have to be "inverted" and/or special test models

SYMBOLS

properties of heat transfer fluid:

- $dK/d\theta$ = rate of change of permittivity with temperature
- ρ = density
- η = dynamic viscosity
- k = thermal conductivity
- c = specific heat at constant pressure

properties of the system considered:

- H = rate of heat transfer per unit area
- θ = temperature rise
- L = a "characteristic" dimension (e.g., cylinder diameter or duct width)
- E = r.m.s. electric stress at heat transfer surface

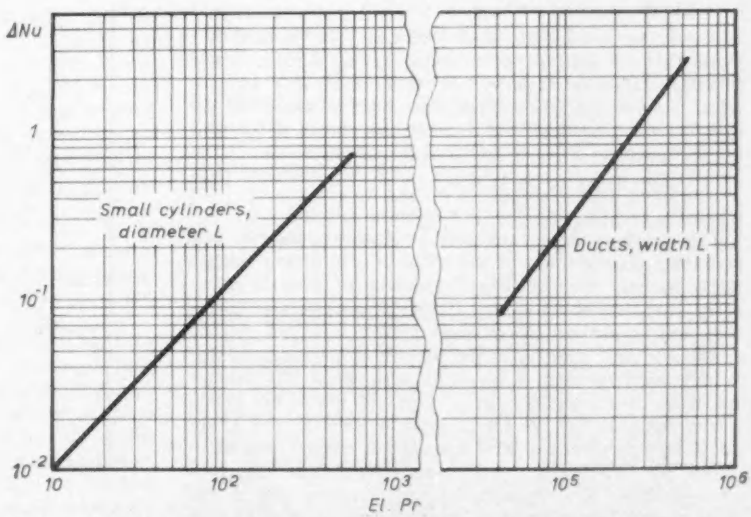

Fig. 1. In designing high voltage apparatus, the effect of alternating stress on heat transfer can usefully be taken into account. This graph gives the data correlation for the effect of an r.m.s. electrical stress on the heat transfer for small cylinders and ducts

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used. A normal transformer winding, for example, can only be stressed electrically under a.c. conditions. Simultaneously passing d.c. equivalent to the load current without saturating the core and measuring the d.c. volt drop accurately, seems to offer very considerable practical difficulties. However, representative models can be studied in which a single winding disc or layer, earthed and heated by d.c., is subjected to operating electric stress conditions by its immediate neighbours, not necessarily heated, at high voltage.

The changes are best studied under constant power conditions. This is because temperature drops in all other portions of the heat path, e.g., through the solid winding insulation (where electric stress has no effect on heat transfer) and through the oil cooler, remain unaffected and the change, $\triangle\theta$, in overall temperature drop is caused entirely by the change in the drop θ due to heat transfer at the stressed surface. $\triangle$Nu can then be derived directly, instead of as a difference, as follows. For small changes it has been shown[1] that:

$$\triangle Nu/Nu=\triangle H/H-\triangle\theta/\theta \quad \ldots \quad (5)$$

and at constant power $\triangle H=0$, so that:

$$\triangle Nu/Nu=-\triangle\theta/\theta \quad (6)$$

Measuring temperatures by resistance thermometry:

$$\triangle\theta/\theta=\triangle R(R_s-R_a) \quad (7)$$

where:

$\triangle R$=Change in heat source resistance following the application of electric stress.

R_s=Heat source resistance at heat transfer surface temperature before stress application=R for an uninsulated source.

R_a=Heat source resistance at the bulk temperature of the heat transfer fluid.

For larger changes, an exact solution is obtained using:

$$\triangle Nu/Nu=-\triangle\theta/(\theta+\triangle\theta) \quad (6a)$$

and R_s-R_a can be corrected accordingly.

Also: $W=IV=I^2R$ (8)

where W is the total power dissipation in the heat source, resistance R, due to current I giving a volt drop V. For small changes in R (W constant):

$$\triangle I/I=-\triangle V/V \quad (9)$$

$$\triangle R/R=2\triangle I/I=-2\triangle V/V \quad (10)$$

In practice, the initial steady value of V is "backed off" to give zero reading on a voltmeter having a much lower full-scale deflection than V. This meter reads $\triangle$V directly when a new steady condition has been attained at the same power dissipation but with electric stress at the heat transfer surface. Then, from (6), (7) and (10):

$$\triangle Nu=-Nu[2R/(R_s-R_a)]\triangle V/V \quad (11)$$

when Nu is calculated for the condition $\triangle V=0$.

The thermal design of high voltage apparatus can profitably take account of the effect of alternating electric stress on heat transfer. Fig. 1 predicts its order in many cases. It should be noted that El.Pr increases with temperature and as the square of both system size and electric stress. For heat transfer at the surface of layer-type transformer windings with $\frac{1}{2}$ in. ducts, tests show Nu number increases of up to 30% at a stress of about 60 V/mil. From equation (3), as for a given system L and k are constant, this means a 30% increase in copper loss dissipated for the same temperature rise. The expected corresponding 30% reduction in temperature rise at the same copper loss will not be fully realised as at the lower temperature level the θ/η portion of El.Pr is reduced. Similar improvement would be obtained were it possible to double the oil duct thickness. Short-circuit tests do not, of course, show this beneficial effect and many such transformers are probably better cooled than acceptance tests would indicate. Allowance for the effect can only be made by using special "thermal image" devices.[7]

Other work[2] points to two further possibilities. First, mixed stress, e.g., due to unsmoothed rectified a.c., may have an even greater beneficial effect on heat transfer, and secondly, the improvement is given when cooling, as well as heating, the oil. Thus, there may be scope for improved performance in oil coolers generally as well as in the pre-heating of all types of oil and other organic liquids for transport, processing and combustion.

The author wishes to express his indebtedness to AEI for their permission to publish this article.

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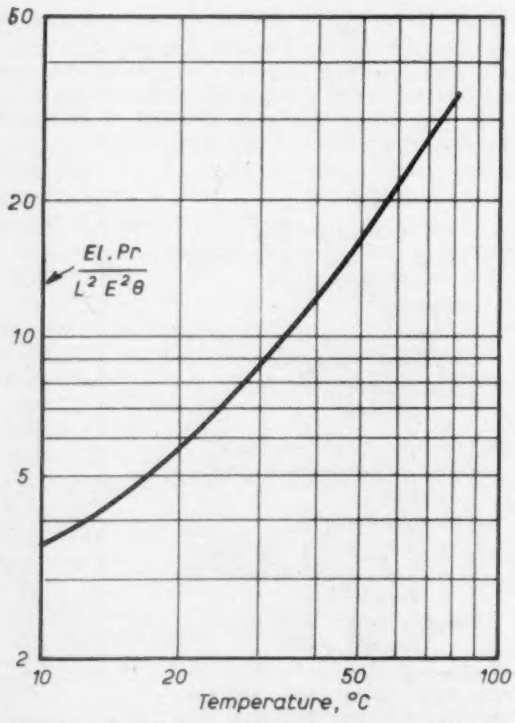


Fig. 2. Graph of El.Pr for transformer oil as heat transfer fluid. L in inches, E, V/mil. and θ, °C

E.D.A. Sales Conference

DISPLAY; FUTURE FOR APPLIANCES; ADEQUATE WIRING

THE Electrical Development Association's conference got off to a lively start at Harrogate on Tuesday morning with film excerpts, animated display models, a broadcast of a "commercial" from a radio station of the future, and a stage dialogue to show up bad salesmanship, all sandwiched between the talks. Already, the chairman, Mr. D. B. Irving, had to place some curb on discussion to allow the delegates time for a preliminary view of the exhibition. The main bone of contention was whether unsuitable candidates for the EDA Salesmanship Course should be weeded out by the boards.

Opening the Conference, Mr. Irving, chairman of EDA Council and of the London Electricity Board, pointed out that while domestic consumption is growing in this country it is still only half the U.S. average.

Safety loomed large in the talk by Mr. J. I. Bernard, director of EDA, who referred to the first group of products to get the BEAB mark (noted on page 347), and the need for an increased percentage of revenue to be spent on advertising by the Supply Industry.

Display for Service Centres

. . . Mr. Nield studies merchandise presentation

THERE are few fields in which material counts so little and imagination so much as in display. Elaborate set pieces seldom achieve commensurate returns in increased sales. Mr C. Nield, of MEB, said this in his address on the Presentation of Merchandise in Service Centres at Tuesday afternoon's session at Harrogate. In the few seconds during which most people pass by, the display window should put over several important factors —location of the service centre, that it was smart and efficient, the appliance on show with price and terms, and some brief but factual sales message. Probably most service centre windows attracted attention and focused interest, but stimulating the desire to possess and inducing the person to act were not so easy. To achieve all this, the well-known canons of effective display should be employed, such as good colour, and the use of lines of focal direction to carry the eye to the main feature. Particular thought should be given to the main sales message. In the case of cookers, for example, the chief sales resistance had been that many women considered the hotplates slow, so today's slogan became "Electric cookers now have fast hotplates."

Mr Nield came down strongly on the side of open-back windows. The passer-by sees the whole showroom and therefore the entire floor and interior walls become display space. Mass production needed mass consumption, so a cheerful "walk-round-the-store" effect was wanted in the service centre, not an atmosphere of privacy or exclusiveness. But there are traps in the open-back system and some ingenious solutions were given. One problem was the unsightly back view of appliances in the window when seen from inside the showroom. Here the suggestion was to conceal the back of the appliance with a pegboard or wire-mesh screen on which a sales message or small appliances could be shown—an answer which gave still more display space! Of course if appliances can be placed back to back, that was another way out.

The biggest surprise for some delegates was Mr Nield's view on demonstration rooms. "Difficult to justify," he said. The day seemed to be past, in many areas, when sizeable audiences could be assured. It was more profitable to go to existing audiences such as associations and clubs. Washing machines could be demonstrated at a sink in the showroom, placed well forward on the sales floor. Midlands Board were experimenting with sink units set in a wall, with a cupboard front. A display normally stood in front of the cupboard when the sink was not required. To make the appliances easy to move about the floor, they could be placed on trolleys or "plinths" that were fitted with castors and covered with felt.

Among the techniques recommended for the interior of the showroom were lamp dispensers for "impulse" buyers, a sales message behind the cashier's desk such as "Take a look at a washing machine before you go," and pogo-stick or peg board mountings for small appliances. The showroom ought to be illuminated to a general level approaching 100 lumen/sq ft with facilities for brighter lights in window areas and for spot-lighting special features. So often service centre staff failed to make use of the flexibility of lighting provided—it was a matter of all on or all off. For the display of lighting fittings, the best method was suspending them in a group from a false ceiling.

To illustrate the work of an area board's central display department, Mr Nield used that of MEB as a working example. So far as possible, at least some of the final display arrangement was left to the local staff. This raised the question of training somebody in the service centres in display techniques. Originally, MEB included a day's instruction in service centre presentation in each person's initial sales training course. Current policy had switched to a one-week residential course at the central department for only those who have a natural flair for display or a genuine interest in it. The fundamental truth that display was an aid to selling was driven home throughout the course.

Good Long Term Prospects

. . . B.E.A.M.A. director on manufacturers' viewpoint

RISING living standards mean a bright future for appliances, but the rewards are not going to fall into anybody's lap—that is the picture from the viewpoint of manufacturers as painted by Mr S. F. Steward at Harrogate. Market saturation levels of even today's popular appliances—30% for cookers, 25% for refrigerators and 40% each for water heaters and washing machines—leaves plenty of scope, quite apart from products just over the horizon. To exploit the opportunities to the full, the supply industry and manufacturers must work in the closest part-

nership on all matters of publicity. At present, advertising is often unco-ordinated. It should not be too difficult to co-ordinate area boards' and manufacturers' advertising in local papers; on the national level, exchanges of information between EDA and BEAMA should help.

All means must be sought to influence Government policy, with stable purchase-tax and hire-purchase terms and adequate plant investment high on the list. Power cuts would be a most serious setback to progress in domestic electrification. Manufacturers, too, have their responsibilities. They have to be prepared to risk money on designs attuned to consumer needs several years ahead. BEAMA hopes to help in these matters by compiling information quickly on production, sales and stocks. Area Boards must find a way of producing a really keen sales outlook in service centre staffs. Some service centres compare favourably with the best of retail outlets, but many are still lacking.

Reviews of the main product groups contributed by the respective sections of BEAMA show that cooker deliveries to the home market are expected to reach parity with gas cookers this year at around the 600,000 mark. But there are difficulties; the increasing number of hotplates, both solid and radiant and in various sizes, is complicating the stock position. Larger grills have proved extremely popular and the eye-level grill has been a strong selling point, but a rather odd situation has arisen with timers. While about one-half of cookers are now sold with timers, a recent survey in Birmingham showed that only 17% of people possessing a timer used it as often as once a week and 34% used it rarely or not at all—surprising when half of the women in jobs throughout the country are married. With regard to export, cooker sales are not yet large, but potential is great and it is essential that we should not get left behind in Europe, where Canadian, Swedish and American cookers are already making great strides. Taken as a whole, the future for cookers is considered to be one of the brightest of all appliances and, as the cooker is often the key to an all-electric home, this bodes well.

In refrigerators, new insulating materials and pancake-type compressors are leading to better space utilisation, and there has been considerable improvement in appearance. The most far-reaching prospect may be the introduction of thermo-electric cooling; prototype coolers are available, but, so far, the cost is too high to warrant production. Washing machine sales are expected to continue at a steady level. There are signs that the market in the south is beginning to develop more rapidly and catch up with the north. The appearance of a new synthetic fabric almost every week is a major problem for manufacturers. Electric water-heaters can hold their own with all competitors, but manufacturers still have to kill the old idea of steep running costs. However, 30% of consumers now have an immersion heater and 8% a storage heater, and a manufacturer would be pessimistic not to have confidence in the future. Perhaps the thorniest problem is that final approval of a water-heater rests with any one of 400 water boards. Ministry of Health by-laws are being revised, and the difficulty will be to get the local water authorities to accept this standard. Space-heating holds out great opportunities, but, in the face of competition from other fuels, there is a certain urgency about the situation. The general public does not understand the problems and advantages of whole-house heating, and if they are not taught quickly it will be too late. Manufacturers must plan in terms of continuous whole-house heating. When a single fire is sold the consumer can be sold a plan as well, into which his single fire will fit over the years.

A review of the EDA Exhibition starts on page 327.

Plan For Two Decades Ahead

... Mr. Jarvis' suggestions on adequate wiring

THE familiar theme of adequate wiring came up for discussion at the conference with the reading of a paper by Mr W. F. Jarvis, of NWEB. The first part was an historical survey of the evolution of modern concepts, concluding with information from the 1959 Building Research Station investigation into the provision of socket-outlets in local authority houses, a study which was fully reported in the ELECTRICAL TIMES, 12 November, 1959.

In considering the future, Mr Jarvis asked a number of questions without discussing the technical and economic implications. Pointing out that wiring must envisage the developments of the next two decades, he asked how long the 60 A main service fuse would remain adequate; should the shortest mains service cable route determine the consumers' intake position, and should consumer service units be revised to include more than eight ways, one or more to be rated at 45 A and usable as a section fuse board? With the loading of domestic appliances continuing to increase, he echoed Mr T. E. Daniel's reference to the need for a 30 A general-purpose fused plug and socket-outlet.

With the growing popularity of timing devices in the home, the suggestion is put forward that a 30 A automatic timer should be provided for the simultaneous operation of any number of appliances. This would entail special wiring with three-position switches for the controlled appliances, namely, off, on, or timer; in the latter case, supply would be taken through the centrally situated timer. Mr Jarvis suggests that such a system could be used for the control of the cooker, immersion heater and general-purpose socket-outlets for space-heating appliances, electric blankets and the like. The general availability of such a timer would enable the consumer to use electricity economically and, possibly, to take advantage of special tariffs.

The suggestion is made that in this country we should start a campaign similar to the Gold Medallion homes so successfully exploited in America. Under this scheme, a grant of $100 a dwelling is made to the builders of houses which meet the required standard of electrical implementation. In the example given, the supply company expects the 2,600 homes awarded the Medallion to consume as much electricity as 13,000 average consumers.

A new approach to adequate wiring for the supply of kitchen equipment is put forward, based on the high rate of boards' cooker sales, which is averaging nearly 7,000 cookers a week. It is considered a possibility to sell the idea to consumers that for a small additional charge the capacity of the circuit supplying the cooker could be increased to provide a number of socket-outlets for other kitchen appliances by means of a local distribution fuse-board, which would also control the cooker circuit. Where a cooker circuit already exists, a similar procedure could be applied when an immersion heater is required. The additional cost of a four-way 15/30 A distribution board or six-way board with auto-timer, instead of the standard water-heater or cooker circuit, would only range from £5 6s to £12 10s. If four-year terms were granted, along the lines of the pre-war assisted wiring scheme, the down-payment would be small indeed. Unless consumers were given some encouragement, they would not worry so long as their installation functioned, nor would they pay for tidying up their meter position with no benefit evident.

The boards alone cannot tackle the problem of inadequate wiring in millions of existing homes. It is suggested that individual manufacturers of accessories, cables and appliances should combine with the ECA, the NICEIC and the boards in a composite scheme, perhaps sacrificing a certain amount of profit.

New horizon for cookers

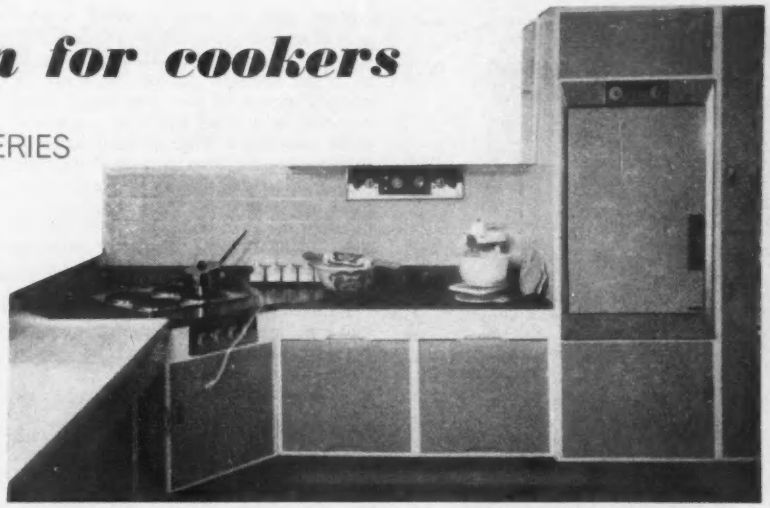
DOUBLE-OVENS, ROTISSERIES AND BUILT-IN UNITS

AMERICAN trends in cooker design are having increasing influence on the British models which are being launched this month for the Ideal Home, EDA and Electrical Engineers' exhibitions. The double oven —either side by side or one on top of the other, giving greater cooking flexibility—is becoming popular, extending into the middle-price range units, a current one by Creda selling at 105 gn. The rotisserie spit is meeting the current demand for cooking of broilers. In some designs the eye-level grill is conveniently extended to incorporate such a device.

Having an annual delivery of about 500,000 cookers, the industry is now bringing out models in competition with the luxury-styled imports from North America and at a more reasonable price. Increased oven capacity, four hotplates and thermostatically controlled hotplates are all features of these new British models all elegantly styled for easy cleaning. Competitively priced designs are also being produced for the built-in kitchen with the oven at eye-level and ample cupboard space beneath, the hob being separate at table height.

Double Ovens

Two firms, Creda and English Electric, have produced cookers with double ovens. "Constellation," Creda's 105 gn model, gives a total oven capacity of 6,000 cu in. with a hob at the convenient working height of 33 in. Both ovens have interior glass doors and lights, and two large warming drawers can contain the complete crockery for a dinner. The roto-spit is a separate unit which simply clips on to the meat pan and automatically connects to the driving motor behind the oven. It is also linked to the automatic timer so that both oven control and spit rotation operate together; and a final crisp browning of meat and poultry can be obtained by switching the oven control to the sizeable grill which is situated in the top. The easi-clean hob has a sunken centre for the four high-speed hotplates, each with a chrome sealing ring and one hotplate has a booster element for speedy boiling. The full-width control panel has sockets at either end, with a centrally placed automatic timer and five-hour minute timer, flanked by the oven and hotplate controls on either side and pilot lights. An additional feature is the die-cast aluminium griddle for steaks, shaped to fit over the centre two hotplates on the hob and having a surrounding channel designed to run fat into a basting well, so that the food remains dry. The second oven is also provided with a full-sized grill and the units are finished in either white or cream stove enamel.



Oven and hob for the built-in kitchen with central control panel by Creda

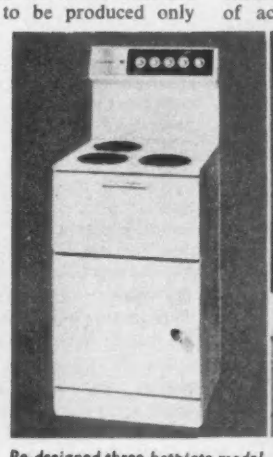
Plinth-type Double Oven

To provide twin ovens in restricted kitchen space the English Electric Co. have become the first British manufacturer to produce a plinth-type cooker with one oven over the other. This has enabled a design to be produced only 21 in. wide by 25 in. deep. The hob equipment has four 7 in. radiant hotplates, three with simmerstat control and the fourth having a sprung thermostat, which presses against the base of cooking pans and allows close temperature control of the pan itself. The main or lower oven, with a 3,000 cu in. capacity, has an interior light and glass door and is big enough for the largest family meal. The upper oven, which incorporates the grill, is 7½ in. high by 15½ in. wide with a depth of 17½ in., giving a cubic capacity of 2,034 cu in. Also in the upper oven is a lower heating element for maximum cooking efficiency.

Selling at a moderate price, only £69, this model, 2034, provides a well-balanced compromise between the features of luxury cookers and the practical limitations of many British kitchens and is easily fitted into unit equipment. A 3 in. high storage drawer at the base is provided for either grill pan or sandwich tins and the unit is fitted with two rear rollers for ease of movement.

Finished in either white or cream stove enamel, the interior of both ovens is of acid-resistant grey vitreous enamel.

Double oven placed side by side in Creda's Constellation



Re-designed three-hotplate model by Tricity

EE Plinth-type cooker with a double oven gives increased capacity

Moffats eye-level oven and sliding hob

The 15 in. high splashplate has a chromium-plated steel facia on which are the controls for the hob, grill, two ovens and the auto-timer. Above the splashplate is a shaded tubular hob-light with a 30 W lamp.

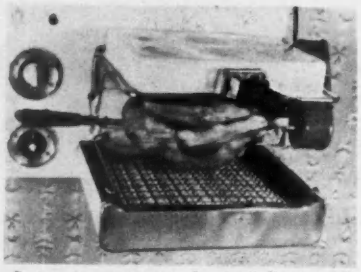
Rotisseries

The rotisserie looks as if it is taking a hold in this country and not only is it available as a fitment in ovens, but advantage is being taken of the eye-level grill to adapt it to this form of cooking. Such an eye-level rotisserie is to be found in General Electric's "Supreme" cooker and may well be the forerunner of others. This unit has obviously a limited capacity, but a small broiler or 3 lb to 4 lb joint may be cooked with ease. It can be attached beneath the grill in a few seconds and can be used on existing models of the "Supreme," being powered by a small side motor which is easily positioned. This cooker retains its former features of a drop front for the oven with a glass inner door, reinforced by a steel grid, the four hotplates are fitted with simmerstats and automatic oven timer. There is also a spacious warming drawer and switch panel at the front of the hob.

Both Creda and Tricity are marketing unit-type cookers with the oven separated from the hob so they can be placed anywhere in the kitchen. To this type of unit Creda have also added their in-built refrigerator, and Tricity are selling the complete oven and hob with their respective cabinets for £120 15s including tax.

Unit Kitchens

The unit for the "planned kitchen" by Creda incorporates their "Mercury" oven with large grill housed in the top and provision for an automatic roasting spit. A warming compartment for plates and food is set above the oven with two shelves and the controls are over the door. As with the "Constellation," the hob unit has four rapid hotplates with one boosted and they are all sealed to prevent leakage of overspill. Here the controls are set at the front and give finger-tip control. A 3 cu ft 'fridge can be supplied to complete the kitchen unit. A final touch of finesse is the detached control panel for the auto-timers and two 13 A sockets which can be recessed into the wall at a convenient height or into the units.



Rotisserie attachment for GEC "Supreme"

Two restyled Tricity models, the "Marquis" and "Viscount," both mark III, are squarely designed with contemporary control panel facias. Models are available with auto-spits if required. The "Marquis," the more expensive of the two, has four 7 in. radiant hotplates with fluorescent lighting over the hob as a new feature. Both cookers have grills in the hot cupboard and are also under simmerstat control. A point which aids cleaning is the overspill tray beneath the hob and designed to run liquid away from the heat centres. These two models sell at 61 gn and 44 gn, respectively, with an additional 5 gn for the auto-spit and a further 5 gn for an easily fixed auto-timer for the "Viscount."

Luxury Range

The unusual features of a sliding hob to reduce projection, together with a thermostatically controlled plate-warmer having its own heating element, are two points which put Moffats latest cooker, the "Fiesta," high in the luxury range. Expected to sell at £225 with a slightly cheaper model at £200, the cooker with an eye-level oven is cabinet styled for wall mounting or on an optionally extra base, with pedal controlled swing-out shelves providing storage space for pans. The sliding hob, with a safety securing catch, has four radiant hotplates; the rear pair recessing under the open plate-warmer when they are not in use. A cut-out switch operates when the hob is recessed, thus eliminating the danger of the plates being left in the "on" position. The picture-frame glass-doored oven has a cubic capacity of 6,000 in. and incorporates a grill and upper grid shelf, which may be set to any height at the touch of a button in the compact control panel.

One of the hotplates is controlled by a sprung thermostat to give sensitive control of the pan temperature and each plate has a sunken overspill pan with a liquid capacity of half a pint and is easily removed to facilitate cleaning.

A mirror-chrome finish in the oven also aids cleaning, as do the separate splashplates which can be fitted as necessary. A particular feature is the automatic meat thermometer to be inserted in the joint while it is being cooked, and which gives a continuous buzz when the meat is ready. The rotisseries can be fitted with six prongs for light delicacies.

WOMEN ENGINEERS IN U.S.S.R.

WOMEN form a much higher proportion of the engineers and technologists in the Soviet Union than in Western Europe or the USA. Factors giving rise to this situation were investigated by two British women engineers who visited Russia last year under the auspices of the Caroline Haslett Memorial Trust. The report of their experiences, which covers also the capabilities of women to benefit from a technical education and their employment prospects in the USSR, was presented to a meeting organised by the EAW last week.

The two ladies who prepared the report are Miss Lesley Souter, B.SC., A.R.T.C., A.M.I.E.E., and Miss Rosina Winslade, M.S.I.T. Miss Souter leads the magnetic materials section of the AEI Research Laboratory, Harlow, and Miss Winslade is assistant instrument group manager at Research and Control Instruments Ltd. Their preliminary conclusions from their visit were reported in the ELECTRICAL TIMES on 13 Oct., 1960.

The conclusions set out in the report indicate that the training and employment prospects of women engineers in USSR are little different from those of men. The high proportion of women among trained engineers is considered to have been made possible by the social and economic state policy over the last 40 years. Moreover, the rapidity with which Russia has developed from a relatively backward state has led to acceptance of women in the engineering profession. The Russian educational system, almost exclusively co-educational, reduces problems in this respect.

Working hours and amenities in Russia, such as kindergartens, make it possible for women to undertake the dual reponsibility of career and home, but the report indicates that, nonetheless, the double job is still somewhat heavy. The two investigators consider women are happy in engineering work and feel frustrated when they leave it for any reason. Finally, they conclude that women are successful in engineering work at all levels and make an enormous contribution to the technical effort of the USSR.

E.D.A. EXHIBITION

NEW DOMESTIC APPLIANCES SHOWN FOR FIRST TIME

NEW products are strongly in evidence at Harrogate, reflecting manufacturers' determination to stay in the forefront of design and development. Fifty-eight manufacturers, including those on the BEAMA stand, are represented this year—the second in which an exhibition has been held in conjunction with the annual sales conference. In addition, EDA are showing the display material and sales literature available to the Boards for the 1961 campaign "Plug in to Electric Living" at stand No. 1 and the Electrical Association for Women are publicising their work from stand 55.

Aerialite **32**

Drying cabinets and a spin-and-rinse dryer are shown together with "Ashatherm" floor-warming, road heating and ceiling cables.

Aidas Electric **27**

New materials are being used for Sadia water heaters, with no increase in retail price. The popular "Twoplus" (more than 250,000 produced since 1957) is now being made with an outer casing of Stelvetite plastics-coated steel. The new finish, launched at this exhibition, has a Morocco leather appearance, contrasting with the enamelled finish of previous models and the reverse side is electro-zinc plated. Initial output is in white, but other colours will be introduced shortly. Fibreglass is replacing copper for the cold-water tanks of cistern-type water heaters from five to 30 gallons capacity. A sectional model of a 20 gallon lagged combination cylinder illustrates the fibreglass tank.

Allied Ironfounders **47**

Seven cookers are on this stand. Newest is the Falco Royalty which cooks by convection with two elements, one at the top and the other at the bottom, and for which fast heating up, quick cooking and, therefore, less consumption of electricity are claimed. The Falco Petite is only a foot high and is equipped with an 8 in. square boiling plate.

AEI **13 and 15**

An entirely new range of Slimline radiant heaters for industrial and commercial purposes is being shown for the first time. Of contemporary design, the series comprises 1 kW, 2 kW and 3 kW models (see picture). Redring boiling plates are on show, also infra-red projectors for such applications as paint stoving, moisture extraction and preheating, which can be fitted end-to-end to form continuous troughs, assembled in banks, or used in angular formation to accommodate products of irregular shape. Manchester Group's contribution is a full range of thermostats for domestic appliances, including several variations of the Simmerstat for cooker-hotplate and grill control and other types for water heaters and convectors, as well as the Sunvic room thermostats.

Backer Electric **40**

The exhibit of industrial elements emphasises the flexibility which is possible in the solution of heating problems; examples of dryer and heavy-duty oven elements are on the stand. On the domestic side, there is a full range of elements for cookers, washers and other appliances, as well as radiant boiling plates of EDA hob-mounted and special designs.

BEAMA **16**

Seven manufacturers are participating in an exhibit of commercial catering equipment. They are Carron, Electroway Heaters, EUK Catering Machinery, Gardiner and Gulland, Radiation, Simplex and James Stott. Most are showing specialised types of cookers, boilers and fryers. Notable features are Carron's Eveready dish-washer, Gardiner and Gulland's food conveyor, Simplex's rotary toaster and James Stott's Connoisseur café set with cabinet.

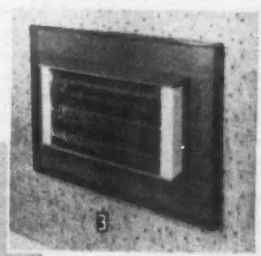
Belling and Co. **10**

A new electric fire, the Corinthian, is shown for the first time. Fires which have been modified so as not to be classed portable, with a resultant tax advantage under the Clean Air Act, are prominent. Cookers make up the remainder of the display with the Classic 60 and 70, now in full production, well to the fore. Fitted to some of the cookers is a new boiling plate thermostat which prevents liquids from boiling over.

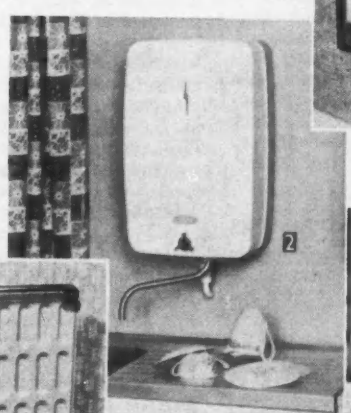
Bendix **52**

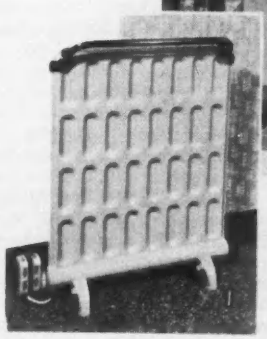
All four models of the Gyramatic washer now have full self-heat facilities. "Heater only" can be selected during the hot-wash cycle, so that the tumbler is stationary while the 2·5 kW heater brings the water to washing temperature. The heater is still automatically switched on during the hot-wash cycle. Safety switches ensure that the heater cannot switch on until there is sufficient water in the tub and that both heater and motor cut out if the clothes door is opened. In addition to three of the Gyramatics, four refrigerators from 4 cu ft to 7 cu ft are on display.

Four of the many outstanding domestic electrical appliances from the E.D.A exhibition. On the right (3) is the "Falks" panel mounting Supersil reflector fire with a 2·25 kW loading.



2. The "Main" 25 A 2½ gall. storage water heater with integral tap





1. The "Dimplex" B.48 radiator and towel rail

4. The new "Hooverette" vacum cleaner in use

Above: The GEC 2·6 cu ft domestic refrigerator
Left: From the Bendix range of domestic refrigerators, this model has a storage capacity of 7 cu ft

Best Products 9

Among the electric kettles on the stand there is the K28, not yet in production. Coffee percolators, and elements for 1¼ kW, 1½ kW and 2 kW irons, are also shown.

Berry's Electric 39

A new 1 gallon water heater, the Magiflow, has an indicator which lights up when the heater is fully charged. Output is 8 gall/hr and loading 2 kW. The cylindrical shape is retained, but this compact heater projects only 8 in. from the wall. A log fire with retractable elements and the Magicmaid food mixer are also on the stand.

BICC 48

Illuminated coloured photographs show Panelec floor-warming systems in detail: the rewirable system which is assembled from standard components to suit individual rooms and the solid embedded system with a choice of terylene/glass roved PVC-sheathed cables or butyl rubber insulated PVC cables, held in position by plastics bars. The system using butyl rubber insulated heating cables is now being widely used for road and ramp heating to clear snow and ice; illustrations show the efficiency of such an installation at The Mound, Edinburgh.

Bulpitt and Sons 45

The prototype of a new electric kettle and modifications to other Swan appliances are on show. The new kettle, a 3 pt model, is made of aluminium. Loadings of 3 pt and 4 pt kettles in the "Royal" range have been raised to 2·75 kW and 3 kW, respectively. A "quick-turn" tap has been fitted to electric urns, and a toaster has been given a new chromium-plated finish. "Cygnet" electric blankets round off the display.

Burco 17

A new drying cabinet, specially designed to allow drip-dry clothes to hang full length, is launched at this exhibition. Only table height, the cabinet has an extension rail to cope with the longer garments. The 1·7 kW heater and the fan are shielded from the clothes to allow dripping wet clothes to be hung with safety. Available in cream or white with blue trim and supplied with a melamine table top, the dryer retails at £21 14s, including tax. Demonstrated on this stand is the latest "Twenty-One" spin-dry washer, fitted with a two-heat immersion element for 2·5 kW or 750 W and incorporating a safety cut-out to prevent overheating. The "Tumblair" tumbler dryer and a full range of electric washboilers are also present.

Cannon, E. A. 7

Not yet available, but on show at the exhibition, is a portable version of the Power-Maid food mixer. Complete with case, the portable model is basically the same as the built-in version, which is fitted into the work surface. The scope of both has been increased by the addition of four new attachments—a mincing machine, a potato peeler claimed to handle 2½ lb to 3 lb in two minutes, a juicer and a shredder-slicer.

Charles Colston 31a

One of the few dish-washers at the exhibition, the Colston brings the water to the required temperature, washes, rinses twice, empties, power dries and switches itself off. During the rinsing a special liquid is injected to give a high-polish finish.

"Diamond H" Switches 43

The prototype of a new hotplate control for luxury cookers is shown; designated 1PW series, this instrument meets the modern trend towards thermostatic control from the bottom of the pan to stop liquids from boiling over. Also on the stand is the new infinite control energy regulator 10ER series for domestic cooker hotplate control, smaller, but interchangeable with the existing 1ER series. The new 20TH oven thermostat is also more compact than its forerunner—it is available with connections suitable for neon indicator or low voltage pilot-lamp indication. Heater switches and miniature relays complete the display.

Dimplex 25

The range of oil-filled electric towel rails has been increased to six with the addition of two models suitable for either floor or wall mounting and designed for the smallest bathrooms. The display includes Dimplex plug-in central heating, a range of ten panel type and four-column type oil-filled thermostatically controlled electric radiators, which provide a portable system without installation cost. Infra-red heaters, both portable and wall-mounted, are also shown.

Electrical Division of Radiation 30

New product for 1961 is the Parnall wringer washer, model EW52/EW52H, with reversible power wringer, automatic emptying pump and a capacity of 6½ lb of dry clothes. Other Parnall equipment on display is the Spinwasher, Auto-Dry tumbler dryer, Ezy-Press ironer and Vibra-Beat suction cleaner. Several cookers and the versatile "202" refrigerator, which may be wall mounted or used as a leg-and-table-top unit, represent the Jackson range.

Electrolux 4

The Dishmaid dish-washing machine, introduced to the trade in February and scheduled to be available in May, is on the stand. Retailing at £61 19s, it will be the lowest price dish-washer on the market. The dishes rotate on a wire cradle at 6 r.p.m. while the crockery is bombarded by jets of hot water from three directions. Hot water is obtained from an external supply. The model 65 suction cleaner is shown with a new turbo-polisher attachment for floor surrounds, furniture and cars. The cheaper model 64 cleaner and three refrigerators are on the stand.

English Electric 6

The new two-oven cooker, launched last week, features prominently in the company of the established cookers, six refrigerators (the newest being the 4·1 cu ft) and laundry equipment (including the Liberator washing machine and the

The "Moffat" 30E 100 W electric cooker for the modern home

A new drying cabinet from "Burco" allows drip-dry clothes to hang full length. Electrical loading is 1·7 kW

tumble dryer). The new cooker, described more fully in this issue under "New Products and Appliances," is Britain's first to have one oven placed on top of another, described as "plinth" type. Three of the four 7 in. radiant hotplates have simmer control and the fourth is fitted with a thermostat which prevents the contents of a saucepan from boiling over. Price is £69.

Falks **12**

A full range of approved fires is on show. Under the Supersil brand there are panel mounted and free-standing fires, the recently introduced high-level heater and the infra-red panel heater, which has three individually switched silica-encased spiral elements with a total loading of 2¼ kW. In addition, the Meteor and Comet reflector fires are exhibited.

Frigidaire **41**

All three of the new SheerLook refrigerators, including examples of both left- and right-hand doors, are being shown. The smallest is 2·9 cu ft, followed by 3·8 cu ft and 5·1 cu ft. Like the other four SheerLook models on display, they are all available in five colours. On the stand the 3·8 cu ft model is shown built into a kitchen setting, together with the Frigidaire spin dryer.

GEC **2**

A new approach to room heating, the prototype of a "Two-Room" heater based on the principle of fan-assisted air convection, is displayed. Fixed in the wall partitioning two rooms, this heater draws in air through grilles near the ceiling, heats the air by means of a Nichrome spiral heating element and expels it through vents at the base of the unit. The heating element has a loading of 4·5 kW and is protected by two hand reset thermal cut-outs; the first 1·5 kW can be switched on to provide background heat only if desired. The air circulation can be directed into either or both rooms by means of adjustable air vanes and, in warm weather, the fan alone can be used. The body of the heater is constructed of mild steel with decorative trimmings at the top. Light fittings from the "1960" and "Variform" ranges are on the stand, as well as the "Treasure 4" cooker with its inner full-view glass door and door-operated oven light, and a range of refrigerators.

Goblin **36**

New attachments for Goblin vacuum cleaners are on display for the first time, together with various types of cleaner.

The Gramophone Co. **5**

The full range of HMV appliances, including the latest fan heater known as the Grosvenor, which is ideal for use as a "firescreen," the IC.10 iron, a coffee mill, hair dryer, food mixer, spin dryer and the Polar Star refrigerators.

Hall and Pickles **44**

Resistance materials supplied to appliances manufacturers, such as Nicralloy nickel-chromium wire, Kanthal wire, Bimetal, elements and thermocouple wire, are on display.

Heatrae **21**

The Heatrae FB water heater has been restyled for improved efficiency and reduced bulk, with no increase in price. Cistern type, this rectangular heater is available in 5 gall, 12 gall or 15 gall capacities, each with 3 kW loading. Also on display are the Lido Express water heater and spray water heater and the Lidomatic hot-water systems. Fires, convector heaters and the Saferod high-level heater complete the display.

Hoover **28**

A stand full of new products is the surprise from Hoover. The Keymatic is seen for the first time; this is a fully automatic washing machine with both a rotating drum and a Hoover pulsator within the drum. A novel feature is the Keyplate, with which the user selects one of eight washing programmes. Then there is the new Hooverette—an upright or hand vacuum cleaner. As a hand cleaner it is slung from the shoulder by an easily clipped-on strap and, for upright use, there is an extension tube and handle. The Hoovermatic spin-dry washing machine has been given a combined thermostat/timer switch. When the correct water temperature has been reached, the heater automatically switches off and as in existing models, washing time can also be selected. Further details and price of these products appear elsewhere in this issue.

Hurseal **49**

The well-known range of oil-filled panel and column radiators and towel rail heaters are on show. Most of the radiators are fitted with the Hurseal double pilot-light thermostat, indicating both when the radiator is plugged in and also when the unit is actually operating.

Kelvinator **24**

All 1961 models of refrigerators are fitted with the "Zero-Plus" freezer, right down to the smallest, the 3·1 cu ft Lady K. Lady K is adaptable, it may be hung on the wall and can be free-standing, built-in or installed under a working surface of normal height.

Kenwood **51**

A new concept in refrigerator and freezer design, developed by Kenwood's own engineers, takes pride of place on this stand. A free-standing 34 in. high refrigerator and home freezer of similar design, which have just been placed on the market, can be bought separately and linked by a special table-top or placed one on top of the other to give a smart unified appearance. Each unit is compressor type. Price for the refrigerator is 67 gn, the freezer 73 gn and the table-top 3 gn.

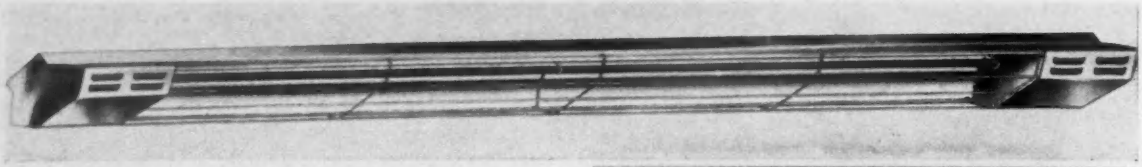
Lec Refrigeration **20**

Eight well-established models are on show—three refrigerators, one refrigerator-freezer combined and two freezers. The smallest, the Coronet, has recently been restyled to incorporate a butter-box in the door.

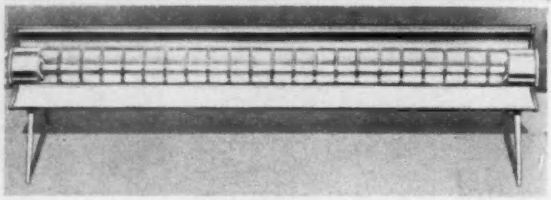
Moffats **42**

Newcomer to the luxury range of Canadian cookers is the Fiesta, previewed at this exhibition. Revolutionary de-luxe features include a push-button powered rack which glides up and down in the eye-level oven to give the best grilling or baking position, a roll-out hobplate and clock control. (Fiesta is described fully elsewhere in this issue). Also being introduced are two new cookers in the 24 in. wide series, one priced at £85 and the other £99 10s. Some of the special features of existing models have been omitted, but both

The new Hoover "Keymatic" with its angled tub-spin-dryer introduces a revolutionary element into washing machine design



One of the new AEI "Slimline" radiant heaters for industrial and commercial use



The Sofono "Jupiter" 2 kW portable heater

retain no-drip hobs, four hotplates with dial-a-heat control and an automatic timer.

Morphy-Richards **38**

A bathroom setting features three of the latest appliances—a wall-mounted infra-red heater which may be adjusted to any required direction, a shaver, and Silavent. Silavent, a British invention, extracts polluted air direct from the w.c. bowl while in use and during flushing. Amid the many other appliances on display, continuous demonstrations are being given of the rotary power ironer. It is foot-operated and shows how this leaves the hands free to guide the clothes. Heaters on display include the Bermuda fan heater and the 2 kW Small Bedroom heater. The VCA suction cleaner is shown with a new design of carpet nozzle. Among the refrigerators, the recently launched Astral 3·5 cu ft is prominent.

Parkinson Cowan **23**

The portable Elfin fan heater, only 6½ in. high, is on the stand, together with the larger but still portable Mayhurst which provides both winter warming and summer cooling. Pirouette, the compact 2,700 r.p.m. spin dryer is the other appliance shown.

Pressed Steel Co. **26**

The new Packaway 8 cu ft refrigerator features in a display of the Prestcold range. Small models suitable for wall-mounting are shown, also the 5 cu ft home freezer.

R. and A. Main **11**

Two versions of the No. 25 water heater are shown—one with an integral water tap and the other without. The latter permits the heater to be installed more economically by use of an economy plumbing kit, which includes a special tap to replace the ordinary tap over the sink. A 2·2 cu ft refrigerator with 5·4 sq ft of shelf area, as well as a portable electric fire and the Mainspin dryer, complete the display.

R. B. Pullin **35**

New thermostats on show are the Mark II version of the A2 room thermostats, the H8, which will fit many immersion heaters, and the C5 contact thermostat, specially manufactured for the new Remploy immersion heater. The floor thermostat, used for a wide variety of controls in buildings, broiler houses and road heating installation, is also shown.

Revo **34**

Two recent models, one "inset" the other "outset," are among the fires on display. Convector heaters, automatic irons and thermostat-controlled cookers are also on the stand.

Rheostatic **37**

The new Satchwell TM room thermostat, shown for the first time, is small in size and has a smart unobtrusive cover in neutral-white polystyrene. The switch mechanism can handle up to 20 A on a.c. supplies. All patterns have an accelerator heater which, by anticipating a rise in temperature when the thermostat is calling for heat, assists in reducing temperature overshoot due to thermal delays. A neon-indicator version is available and is ideal for off-peak heating systems. Controls for cookers and heaters are also on the stand.

Robert Maclaren **33**

A new version of the Type TC thermo-time regulator, with a capillary and bulb as the thermostatically sensitive medium, is on show for the first time. In its standard form this instrument is fitted with an electric synchronous clock motor, but a spring reserve motor can be supplied as an alternative. A half-day omission device can also be fitted as an optional extra. Also on display is the bi-metallically sensitive Type TA thermo-time regulator.

Santon **14**

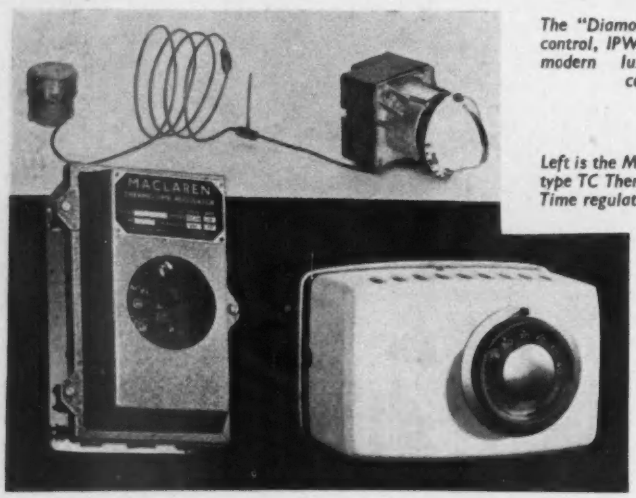
A selection from the comprehensive range of immersion heaters and industrial liquid heaters is on show. Among the thermal storage units on view is the newly designed 30 gall floor-mounted type. The range of combination cylinder water heaters has also been increased, one of the most recent being the Hercules off-peak which has a magnetic inlet valve that excludes cold water during the non-heating periods. Small central-heating units as used domestically are represented, as well as the larger models for bulk hot-water circulation, as in swimming baths.

Simplex **22**

The twin idea, appliances which may be bought separately and then matched as a unit, has been adopted for the new Creda Laundrair washing machine and tumbler dryer. The washer includes a spinning sequence to bring the clothes to "damp dry." Washing and spinning are controlled by an automatic timer, but not the rinsing. The companion tumbler dryer has three-heat control and a variable timer for damp ironing or bone dry. Also new is the large and luxurious Creda Constellation cooker, which has two ovens side by side, a dozen controls and plate warmers.

Simplus **31**

A contemporary-styled range of ironing tables is featured. Designed to com-



The "Diamond H" hotplate control, IPW Series, for the modern luxury domestic cooker

Left is the Maclaren type TC Thermo-Time regulator

The new Satchwell room thermostat

plete the up-to-date housewife's home laundry equipment, they are fitted with four slide-away fittings including holders for iron, flex and ironed garments.

Smiths Clocks 50

The 1961 range of Sectric electric clocks is on display. Both wall and mantel models are included and an alarm is a general feature. Design is mainly contemporary, but there is also the "Cornishman," a ceramic wall clock in blue and white, styled to harmonise with Cornish kitchenware.

Sofono 53

Three new Jupiter infra-red heaters are shown, a 1½ kW model for wall fixing, a portable 2 kW, and a 1½ kW version for chain-suspension in industrial premises. Tapered legs are a new feature on both the existing 750 W heaters and the new portable model, as well as the 1961 range of Spacemaster convectors and reflector/convectors. On request, any of the appliances are taken to pieces and reassembled on the stand to show constructional details.

Tetra 19

Development has just been completed of a fully automatic kettle element with the high loading of 2·6 kW for a.c. only. A number of them have been under continuous dry condition tests for 24 hours a day for two years without any failures. Specially designed kettle bodies are essential to prevent spillage caused by the turbulance created by such a highly loaded element. An element with a higher loading still, 2¾ kW, is being developed. In addition to the above designs, the range and applications of rod elements have been greatly increased.

Thermair 29

"Heat'n Lite," the circular ceiling fitting which provides both instant radiant heat and light is prominent. The light is controlled by the normal switch and the heat by a pull switch built into the product. The Panorama infra-red portable heater and the Thermair clothes heated spin dryer are on display.

Thermalay 18

The familiar electrically heated underfelt is shown here. Electric wires covered with hard plastics, inserted into ordinary underfelt and controlled by a thermostat, provide the warmth.

Thorn 46

A-Plan, Atlas Lighting's versatile new fluorescent series with fittings for every room, is on display. The fittings are based on six basic types and finishes of various colours are available. Chelsea and Finlandia tungsten filament lighting fittings are also represented while, among the Tricity range of cookers and refrigerators, the recently launched Diner-Cold refrigerator, in its elegant wooden "dining-room" cabinet, is a prominent feature.

Wandleside 3

A sectional model of the Florawarm solidly embedded under-floor-warming system is on the stand, along with a comprehensive range of insulated cables with emphasis on the domestic appliance field. Apart from the standard lines in rubber, p.v.c., polythene and braided types, the group manufactures a wide variety of heat-resistant cables insulated with p.v.c. asbestos, neoprene and p.t.f.e.

Wilkins and Mitchell 8

In both the Supertwin spin-dry and Superheat wringer-type ranges of Servis washing machines, a modification has been made to the four-vaned agitator, extending the vanes to the top of the agitator stem. This produces improved agitation, in the "lazy water" zone.

500 MW Unit Sets for West Burton

LAST week, the CEGB announced their intention to place orders totalling about £34 million with English Electric and International Combustion for the turbo-generators and boiler plant at West Burton. This station, which will have only four sets generating a total of 2,000 MW, will be the largest in Europe when it is completed in 1967. The announcement of the contracts follows quickly on last week's news that the Minister of Power had granted approval for the station, which is to be about two miles south-west of Gainsborough. The contract to be placed with English Electric is claimed as the largest so far for turbo-generator sets and covers four single-line 500 MW units. The contract also includes condensers and main boiler feed pumps which will be turbine driven.

The 500 MW sets will have a multi-cylinder reheat turbine arranged as a tandem compound unit solidly coupled to a hydrogen and water-cooled alternator. Special features will include automatic gland packing, electronic supervisory gear with centralised control and the use of an alternator in conjunction with silicon rectifiers to provide the excitation. This method of excitation enables the alternator to be direct coupled to the main machine, so eliminating not only commutation problems but also the need for a large reduction gearbox.

The turbines will operate with steam conditions of 2,300 lb/sq in. 1,050°F at the stop valve. Steam reheated to 1,050°F will feed the intermediate cylinder and the vacuum at m.c.r. will be 28·7 in. of mercury. The first stages of the high-pressure cylinder will have a double casing to meet the high pressure and temperature conditions. The intermediate cylinder will be similar to the high-pressure cylinder in having a partial double casing construction at the steam inlet end. The multi-flow low-pressure cylinder will be arranged in double-flow low-pressure casings with the outer flows forming an integral exhaust chamber.

The alternator will run at 3,000 r.p.m. and generate at 22 kV. It will be designed for a short-circuit ratio of 0·4 and a power factor of 0·85 lagging. The rotor will be machined from a single forging while the stator will be in two parts, an inner frame carrying the core and windings and an outer casing supporting the inner frame and the hydrogen coolers.

The cooling system will be unusual in that heat extracted from the alternator heat exchangers by circulating condensate will then be returned to the feed water system. Two methods of cooling will be used, the stator conductors will be cooled by circulation of demineralised water and both stator core and the rotor are to be cooled by hydrogen at 60 lb/sq in. Hot gas emerging from the stator will pass through a primary cooler, then through a blower and diffuser before re-entering the machine through a secondary cooler.

Feed heating will be by seven bled steam stages with the h.p. heaters in the discharge side of the steam turbine-driven main feed pump.

The four reheat boiler units are to be built and designed by the resources of International Combustion and Simon-Carves. Each boiler will have a 3,450 klb/hr evaporative capacity providing steam at 2,400 lb/sq in. gauge and 1,055°F. The boiler design will be a development of the 550 MW Thorpe Marsh units and will incorporate reheat to 1,055°F and controlled circulation. The furnace will be skin-cased with the company's cubic expansion method of suspension. The single, sub-divided furnace will have tangential firing with fuel supplied by six, pressure type, pulveriser mills.

Professional reorganisation

I.E.E. ANNUAL DINNER SPEECHES

REORGANISATION of the Institution of Electrical Engineers, both internally and in its relationship with other professional engineering institutions, formed the principal theme of Sir Hamish MacLaren when he spoke as president at the Institution's annual dinner last Thursday. Sir Hamish commented that electrical engineering was an art, in the application of which a revolution occurred every ten years; so it should not be surprising that the Institution should be considering adjusting itself to match progress.

So far as internal arrangements were concerned, there had been two years' consideration of the problem of re-shaping the specialised sections. That such a change was being considered at the present time did not imply that the Council had been failing in their responsibility to members in the past. The line of approach favoured by the committee considering reorganisation was explained to Council last July, and Sir Hamish said he hoped that final recommendations would be submitted to Council in the near future, and that a bold and imaginative approach would be adopted.

Attracting Recruits

Apart from any need for reorganisation within the Institution, there was an awareness amongst chartered engineers of the need for more cohesion in the profession as a whole. Although Britain had produced so many outstanding engineers, it was regrettably also true that there was more misunderstanding about engineering in Britain than in any other country. Bright people were attracted to science, but there was a time lag between the important discoveries they made, and their application to every-day affairs. This was not unconnected with the shortage of engineers. An attempt had to be made to increase engineering's share of the best brains.

Sir Hamish said he agreed with the immediate past-president, Sir Willis Jackson, that amalgamation of the principal engineering institutions was not the right solution. There was certainly a need for an institution devoted to all aspects of electrical engineering—though any further fragmentation by the introduction of other institutions concerned with electrical matters would not be right. Sir Hamish suggested that some matters concerning professional engineers could be handled better than at present if there were a body which could speak for all the institutions with one voice. It might be a new institution, or alternatively, a joint council drawn from the existing institutions. His own view was that a "super-institution" should be set up, membership of which would be confined to all chartered engineers.

Sir Hamish went on to deplore early specialisation in education. He suggested that the country might have gone far enough in shortening the working week, and that some of the increased wealth made available by technical advances should be devoted to extending the time during which the 5% best intellects amongst young people should be allowed for educational development. They should be allowed to study at a more leisurely pace, with specialisation at about 17, not between 14 and 15 as at present. This should apply even if it meant an additional year spent on university study. He felt sure that results of such a scheme would justify it.

Principal guest at the dinner was Mr R. Wood, Minister of Power. He said that so far this winter, despite a maximum demand on 13 December, which was the highest ever and 6% more than last winter, load shedding had not been necessary. To meet the rapid growth in demand for electricity, installed capacity of generating plant in England and Wales had increased by nearly one-half in the last five years. Last year one-eighth more electricity was sent out than in 1959, a remarkable rate of expansion even allowing for the cooler weather of the summer.

M.o.P. and Industry

Mr Wood said that, when he first went to the Ministry of Power, he spent a great deal of time wondering what should be the Minister's precise relationship to the electricity supply industry. There were times when he began to suspect that the industry's smoothness of operation was in inverse ratio to the number of occasions on which the Minister tried to interfere—but he countered murmurs of approval from the audience by saying that he now doubted if this was right. Amongst fields in which co-operation between the industry and the Minister could yield results were safety, particularly in connection with nuclear stations, and preservation of amenities.

The Minister acknowledged that it was not his responsibility to fix tariffs in the industry, but on the other hand, the structure and level of tariffs did concern him. In the framework of competitive fuel policy which the Government believed right, the Government had to see that competition between electricity and other power industries was on a basis of prices properly reflecting the relevant costs. This was underlined by the importance of the industry in the national economy, with its annual spending of £300 million, about one-sixth of total public investment. The Minister had to satisfy himself that the industry's investment claims were not inflated through its selling at less than cost in any major market served.

The toast of The Guests was proposed succinctly by Sir Willis Jackson. The response on behalf of the guests was made by Mr W. T. M. Beale (Minister for Economic Affairs, American Embassy), who spoke of his country's current economic problems and of the plans for escaping from them. He made special mention of the drive to expand American exports and bring in overseas investments, which would become apparent during the next few years; and of the possibility of close connection with the industrial countries of Western Europe and with Canada through the new Organisation for Economic Co-operation and Development, successor to OEEC.

AROUND THE TRADE

BY PEREGRIN

THE effectiveness of after-dinner speeches has long been a bone of contention with the organisers of dinners. The ECA Diamond Jubilee dinner had both hit and miss results. Norman Collins utilised the electric band wagon to tinkle out witticisms—for example, "In my opinion this electricity business has come to stay and I can be quoted." Such frivolous treatment of this adult industry may not create the desired effect. The serious and practical suggestions of Mr D. E. Gibson, an architect, were so simple and commonsense as almost to guarantee that they will never be put into practice. His suggestion regarding competitive prices and rates, instead of eight or nine contracting firms wasting valuable time and money in quoting for one installation, was well worthy of note. The rest of the speeches were in serious vein, adequate but ordinary, with neither fanfare nor fireworks to herald 60 years of work and progress.

It has come as a shock to many members of the ECA to learn that their Director, Mr L. C. Penwill, is to retire in 1962. A man of great energy, and infinite capacity, with an astute mind; the ECA will be hard put to it to replace him. Quite an interesting situation will develop, I think, between the contracting and retailing sides and perhaps the north of the border, ECA of Scotland. A time for warm hearts but cool heads, I feel.

I see that the EDA are in the throes of their Annual Sales Conference. It is to be regretted that this wealth of educational material will be there exclusively for the boards. This is quite wrong. The EDA was started by all and sundry connected with the industry and is now kept going by consumers' money—including that of electrical contractors and retailers—and thus should not be exclusive to any section of the industry. A little commonsense give and take would enable this vast storehouse of electrical sales knowledge to be made available to a wider field with ultimate advantage to all.

Appliance Reviews

The February issues of *Which?* and the *Shoppers' Guide* make interesting reading. In the latter, the first paragraph of an excellent review on small water heaters gives the precise information, which I fondly hope all my staff have absorbed, and are capable of putting over to the public. One small heater, which is not mentioned, I have just installed for a customer with plumbing problems. The distance from storage heater to bathroom taps necessitated gallons of water being drawn off before hot water reached the taps. A 3 kW Santon pipe heater fitted above the bathroom ceiling gives almost instantaneous hot water for hand washing and everyone is happy. Incidentally, nearly 40 years ago Santon sold a 4 kW heater which hung on the tap. It was shaped like an open trough, with an element in the bottom. The water from the tap ran over the element and the rate of flow controlled the temperature reached by the water. The heater was subsequently withdrawn both for safety reasons and for the jolt which the 4 kW gave to inadequate mains.

Which? compares the performance of the two cheapest washing machines. the Brunlec and the Flatley, with that of better machines. I do not know the Brunlec, nor care for what I read of it; the Flatley, in my opinion, gives value for money and no more. The performance of the Hoovermatic, however, at full rated load as shown on the chart, compares unfavourably with other makes. I feel Hoover's should do better than this. And talking of Hoover's, I wonder if they really have complete faith in the efficiency of all the cleaners they make? Conversation with some of their salesmen leaves me with the impression that they make purely-suction cleaners simply because there is a market for them, but that they know that only the upright model with the beating action really cleans the carpet. One of my customers expressed the opinion that "they must have used all the power to make the Constellation float, it was so inefficient." Certainly, the brush on the old model does twice as well as the new adjustable chromium-plated nozzle.

All of which really goes to show that it is high time we had a body of experts in this country who would take over the work of *Which?* and the *Shoppers' Guide* and check electrical appliances for fitness of purpose and efficiency, as well as safety. This might prevent the troubles we have had from time to time with Swan aluminium kettles, Creda Debonnaire switches, Flatley drying cabinet elements and so on. I suppose the Flatley conversion unit is a good idea but why should the public pay for Flatley's research experience? Normally, such elements go on and on without renewal.

New Models

And coming back to Hoover's again, I see they have gone to town with some new appliances; a small vacuum cleaner, an improved combined washing machine, and a fully automatic washer of the Bendix type. The vacuum cleaner, which will eventually depose the Dustette, I fancy, looks rather like the old Bustler which, I believe, was made in Birmingham and was very popular in the Midlands for many years. The new Keymatic washer has several new ideas I like—the angled drum and the clothes washing always in the water. The famous pulsator boiling action can be switched in at will as the type of washing demands. There is no drain screen, I understand, as the pump is capable of carrying away all residue. I hope so, as the famous pulsator boiling action always seems to me to be a little drastic on the clothes; Bendix is gentle by comparison. One item I view with mixed feelings is the "key" —a flat piece of material which pushes into a slot on the machine to set the switching for whatever type of washing action is needed. The machine cannot be started without it and dealers may have reason to fear that it will prove an attractive plaything for the very young, who cannot leave alone any loose or moving part. I should advise a few spares being carried.

These new machines are being first introduced to the dealers with a great and expensive flourish. I cannot help wondering whether a little less expensive presentation might not ensure a slightly cheaper article. Pounds instead of guineas would even be acceptable!

Personalities *in the industry*

Mr A. M. Scales

Mr D. McC. Pullon

Mr L. J. Brown

Mr H. D. Walker

Mr N. McAdam

Previous area manager for Scotland, **Mr A. M. Scales,** has returned to the London head office to take up a new appointment as marketing manager for Atlas Lighting Ltd. Mr Scales will be directly responsible to the general sales manager and his appointment will include control of the Advertising and Sales Policy Departments. He joined Atlas Lighting Ltd. in 1949 after war service, and has been concerned with many activities for the company. It was in September, 1959, when he was in charge of the Atlas Sales Policy Section, that he was appointed area manager for Scotland. Mr Scales was also responsible for the formation of a new Scottish branch of the Electrical Trades Commercial Travellers' Association and was elected the first chairman of that branch.

Managing director of the Domestic Equipment Group of the General Electric Co. Ltd. since January, 1960, **Mr E. A. Fowler,** M.I.E.E., F.I.E.S., has relinquished that position and at the present time **Mr G. M. Tomlin,** director and general manager of Salford Electrical Instruments Ltd., is acting as managing director of that group. An announcement is shortly expected concerning Mr Fowler's new position.

Sir Leslie Gamage, who recently retired as chairman of the General Electric Co., continues to act as chairman of Pirelli-General Cable Works. **Mr R. H. Phillips** has been appointed a director of the latter company. He is managing director of the GEC Installation Equipment Group.

Appointed to be organisation and methods officer to the East Midlands Electricity Board, as from 6 March, is **Mr D. McCann Pullon,** A.I.M.T.A., who has served with the Notts County Council for many years. He joined the County Treasurer's staff in 1939 after completing his education at Nottingham High School. Following war service as a wireless operator and later as a wireless mechanic, he rejoined Notts CC in 1947, and was subsequently transferred to the Internal Audit Section, where he was promoted to senior internal auditor in 1950, a position he held for over four years. A further move, in March, 1954, saw him become first education accountancy assistant. Then, in September, 1955, he was selected from 184 applicants as the first organisation and methods officer to serve on the staff of the Clerk to the Council, the position he now relinquishes on joining the staff of the Board.

Mr L. J. Brown, F.C.A., and **Mr Hector D. Walker,** M.I.MECH.E., have joined the board of Johnson and Phillips Ltd. Mr Brown is a director of Electric and Musical Industries Ltd. and was for some years managing director. He is the resident director in the UK of the Schlesinger organisation. Mr Walker is a director of Constructors John Brown Ltd. and its subsidiaries and other companies. It is also announced that **Sir Richard E. Yeabsley,** C.B.E., J.P., having, at the request of HM Government, accepted an invitation from the chairman of Bailey (Malta) Ltd. to join the board of that company, has stated that in view of this appointment and his other commitments, he will not offer himself for re-election as a director of Johnson and Phillips when he retires by rotation at the next annual general meeting.

Formerly divisional director (electronics) with Bruce Peebles and Co. Ltd., **Mr J. W. Haig-Ferguson,** M.A., A.M.I.MECH.E., A.M.I.E.E., A.M.I.PROD.E., has joined R. and J. Beck Ltd. as managing director. Born in Edinburgh, Mr Haig-Ferguson was educated at Wellington College and Queen's College, Cambridge. In the latter part of the war he served as an officer in REME. After varied industrial experience in the technical and production side of industry, he was appointed divisional director (electronics) of Bruce Peebles and Co. Ltd. He was responsible for the newly formed Electronics Division of this company which has grown rapidly in the field of industrial control systems and other special purpose electronic equipment.

Mr N. McAdam, B.SC., has been appointed chief engineer of the Industrial Valves and Cathode Ray Tubes Department, AEI Radio and Electronic Components Division. Educated at Rutherford College Boys' School and Armstrong College, Durham University, Mr McAdam joined A. Reyrolle and Co. at Hebburn-on-Tyne as a student apprentice in 1928 and graduated in electrical engineering in 1933. In 1934 he became a unit foreman with Mullard Ltd. at Mitcham, and in 1935 joined the Edison Swan Electric Co. as a junior development engineer at Brimsdown. In 1940 he was placed in charge of Mains Valve Development and in 1947 went to the company's Valve Factory at Sunderland as chief factory engineer. He became Divisional chief inspector for the Edison Swan group of factories in 1955, but three years later joined Copeland and Jenkins Ltd. as general manager, being appointed a director of the company in 1960.

Formerly with the Radiation group of companies, **Dr W. Davidson,** PH.D., M.I.H.V.E., M.INST. GAS E., M.INST.F., has joined Powell Duffryn Ltd. in charge of research and development for their Heating Division and has also joined Powell Duffryn Technical Services Ltd.

Previously in charge of the Process Control Contracts Group of the AEI Instrumentation Division, **Mr C. H. Copley,** B.SC., A.INST.P., has joined R. B. Pullin and Co. Ltd. as manager of their newly formed Process Control Division which is to manufacture and market a

wide range of instrumentation and control equipment for industrial applications.

Dr D. N. Truscott (of the General Electric Co. Ltd.) has been elected chairman of the Electronic Engineering Association, in succession to **Mr L. T. Hinton** (Standard Telephones and Cables Ltd). **Mr W. D. H. Gregson** (of Ferranti Ltd.) has been elected vice-chairman in succession to **Mr R. R. C. Rankin** (Mullard Equipment Ltd.).

With the appointment of **Mr B. W. Ricks,** M.I.E.E., A.M.B.I.M., as deputy chief engineer of the Eastern Electricity Board, **Mr G. M. Holland,** M.I.E.E., A.M.B.I.M., at present the engineer of the Essex sub-area, has been appointed engineer, Northmet sub-area. In turn, **Mr C. C. Brazier,** A.M.I.E.E., engineer of the Norfolk sub-area, becomes the engineer in the Essex sub-area. After obtaining his education at the Stanley Technical School, Croydon, and the Regent St Polytechnic, Mr Holland joined the Croydon Corporation electricity department as an engineering student in 1927 and later held various technical appointments with that undertaking. In 1947 he was appointed technical assistant to the Peterborough electricity undertaking, and in 1948 became planning and development engineer for the Fens sub-area until in 1956 he was appointed sub-area engineer. Early in 1960 he was selected to fill the vacancy of engineer, Essex sub-area. Mr Holland has attended a number of management and other courses and served as a member of the Board's study group formed to review the operation and establishment of showrooms. He is keenly interested in education and training activities. Mr Brazier obtained his technical education at the Manchester and Leeds Colleges of Technology and initial training with Mather and Platt Ltd. Subsequently he held various appointments in the supply industry in Yorkshire and Lancashire and after nationalisation was appointed assistant engineer in the Barnsley district. He joined the Midlands Electricity Board in 1952 as planning and technical engineer, Shropshire and Herefordshire sub-area, and was appointed deputy sub-area engineer in 1957. Mr Brazier has attended a number of management and technical courses and is himself an experienced lecturer on technical subjects.

Electrolux Ltd. have appointed **Mr Maurice Gomme** to be sales manager for their new "Dishmaid." Mr Gomme has been on the staff of the company's general sales manager at head office since May, 1960, and was previously divisional manager of the Electrolux South Eastern division. He joined Electrolux in 1948 as a contracts representative in the Midlands, and was later appointed contracts manager at head office. In 1954 he was appointed deputy manager of the company's former South London division, and he became manager of the South Eastern division on its formation in 1955.

Formerly with AEI-Hotpoint, **Mr H. W. Thompson** has joined Philips Electrical Ltd. to take charge of a new domestic appliance group which is now being formed. The company are to launch out in this sphere next year, as we report on page 345. Mr Thompson has had extensive experience in the major domestic appliances field; he was previously divisional sales manager and then marketing manager with AEI-Hotpoint. Also in this new group of Philips are **Mr H. N. Pantlin,** who has been technical manager of Philips Electrical Appliances Division for 2½ years after being chief engineer of English Electric's Domestic Appliance Division, and **Mr B. N. Lewis.**

Major F. D. Outridge, R.A.(RETD.), F.C.C.S., has been appointed assistant to Capt R. A. Villiers, C.B.E., director of the Scientific Instrument Manufacturers' Association. He will be particularly responsible for the publicity and exhibitions of the Association in the UK and overseas, and will also act in a secretarial capacity to the main committees.

From 1 March, 1961, the Rectifier Engineering and Semiconductor Engineering Departments of the AEI Heavy Plant Division have been combined to form a single new department having the title Power Rectifier Engineering Department. **Dr J. C. Read,** D.SC., M.I.E.E., who has been manager, Rectifier Engineering Department, since 1949, has relinquished that position to take up an appointment as divisional consultant—rectifiers, and **Mr W. D. Sinclair,** A.M.I.E.E., manager of Semiconductor Engineering Department since 1957, becomes manager of the new Power Rectifier Engineering Department. In his new capacity Dr Read will maintain close contact with engineering and development, and with the manufacture and sale of power rectifier products of the AEI Heavy Plant Division, acting as adviser to the managers of the Power Rectifier Engineering and Sales Departments. He will continue to represent AEI on national and international committees dealing with power rectifiers and allied subjects. After graduating he joined BTH as a student apprentice and, on completing the three-year course at Rugby, he entered what was then the AC Engineering Department, where he was employed on induction motor design and research. When the company decided to enter the power rectifier field he was appointed to work on this subject, and after periods of investigation on the Continent and in America he assisted in the design of the first British mercury arc rectifier. In 1942 he became the company's chief rectifier designer, and when the Rectifier Engineering Department was formed in 1949 he was appointed manager. Mr Sinclair completed a post-graduate apprenticeship at the BTH Rugby works and joined the Vacuum Physics Section of the Research Laboratory in 1939. During the war he was concerned with the design and development of valves for military radar. In 1944 Mr Sinclair was in charge of the Research Laboratory Street Lighting Section which was responsible for the introduction of the first fluorescent street lighting installation in the world; he also lectured in the USA on British street lighting developments. After forming the Research Laboratory Special Products Section, concerned with the application of new developments in industry, he was assigned to special investigations on lamp production, stock control and distribution. He joined the lamp

Mr G. M. Holland

Mr C. C. Brazier

Mr H. W. Thompson

Dr J. C. Read

Mr W. D. Sinclair

organisation in 1950 as assistant to the manager, and was appointed superintendent, Lamp Works, in 1954. Seconded in 1955 to assist in the formation of the Semiconductor Materials Engineering Development and Manufacturing Departments, Mr Sinclair subsequently succeeded Mr T. H. Kinman in 1957 as manager of the Semiconductor Engineering Department at Rugby, the position he held until his present appointment.

London area manager of the EMB Co. Ltd., **Mr R. S. Montgomerie** is to retire at the end of April due to indifferent health, but he will continue to serve the company on a part-time basis. His assistant, **Mr P. N. Jay,** will become the London area manager.

Head of the Department of Electrical Engineering at Exeter Technical College since 1957, **Mr Roy L. Helmore,** B.SC., A.M.I.E.E., is leaving that post at the beginning of May to become principal of the St. Albans College of Further Education and the Hertfordshire College of Building.

Mr H. F. Spence, managing director of Richard Thomas and Baldwins, has accepted appointment as president of the British Iron and Steel Research Association in succession to the late Sir Charles Bruce-Gardner.

Among ten British University professors who will lecture at Soviet Universities during the next two months is **Prof M. G. Say,** PH.D., D.I.C., F.R.S.E., of Heriot-Watt College, Edinburgh. He will lecture on "Electrical Machines" between 3 and 18 April.

Mr W. H. Stewart, GRAD.I.E.E., has been appointed as a technical representative to Preformed Line Products (Gt. Britain) Ltd.

Under the arrangement whereby Ocean Trust Co. Ltd. has acquired an interest in A. J. Flatley Ltd. (to which we refer on page 345), **Mr A. J. Flatley** retains control of the company, of which he remains chairman and managing director. **Mr G. D. Broadfoot,** who has been chief designer to the firm for some time, is promoted to joint managing director. **Mr R. B. Pursey,** managing director of the Ocean Trust Co. Ltd., joins the board of A. J. Flatley Ltd. along with **Sir Edward Beddington Behrens** (chairman of Ocean Trust), who will act as financial adviser.

Several commercial executive appointments are announced by H. Frost and Co. Ltd. **Mr J. G. Cooper,** who becomes general sales manager, is at present touring overseas, but returns later this month. Promoted to home sales manager is **Mr D. F. Blake,** who was previously deputy sales manager, and supporting him are **Mr J. Turrell** as London area manager, and **Mr A. Donald** as Scottish manager. In addition, **Mr T. A. Jackson,** who has represented the company and other manufacturers through a mercantile firm overseas for a number of years, has returned to the UK and is appointed manager, sales office and distribution, covering both home and export markets.

Mr A. G. Robertson, who has retired from his post of director of the Post Office in Scotland and who was previously director of contracts at the General Post Office in London, has been appointed secretary of the natural resources committee of the Scottish Council (Development and Industry).

Formerly first assistant commercial engineer in the Rochdale district of the North Western Electricity Board, **Mr H. Howitt,** B.SC.(TECH.), A.M.I.E.E., has been promoted to district commercial engineer for the Board's Macclesfield district. Mr Howitt, who is 36, was educated at Chadderton Grammar School, and after military service as an electrical mechanic in the Royal Engineers, working on power supply systems in the Middle East, obtained his B.Sc.(Tech.) at Manchester College of Science and Technology. In 1951 he was appointed by the Board as a graduate trainee in its No. 3 sub-area and he later became an assistant engineer, working in the organisation and methods team at Board headquarters. In 1959 Mr Howitt went to the Board's Leigh (No. 2 sub-area) district on general engineering duties and obtained his position at Rochdale last year.

District engineer at Gravesend to the South Eastern Electricity Board since 1951, **Mr E. Ledgard,** A.M.C.T., A.M.I.E.E., has been appointed Woking district manager to the Board. There he will succeed **Mr E. Peel,** M.I.E.E., who, as we have already reported, is transferring to Sutton. Mr Ledgard received his early training with Rochdale Corporation Electricity Department, serving as a l.t. mains engineer before leaving to take up the post of technical assistant and substations engineer at Dover in 1945. Subsequently he became development engineer there, and early in 1948 joined the Paisley Corporation undertaking as deputy electrical engineer and manager. With nationalisation of the industry he was district engineer there to the South West Scotland Electricity Board until 1951.

Mr G. W. H. Richardson has resigned as a director of Westinghouse Brake and Signal Co. due to increased business commitments.

Assistant district and commercial engineer at Richmond, Yorks, the North Eastern Electricity Board, **Councillor J. B. Hood,** A.M.I.E.E., has retired after 50 years' service in the industry. To mark his retirement Mr Hood was the recipient of a presentation made by **Mr W. K. Fleming,** sub-area manager.

Mr F. T. Gale has been appointed general manager of Calgary Power Ltd. in succession to **Mr A. W. Howard,** who has been promoted to vice-president.

Formerly assistant marketing manager in the home laundry group and product planning manager for AEI-Hotpoint Ltd., **Mr B. Winship** has been appointed marketing manager of the sheathed wire and special products section of the company.

Mr C. T. Roberts, B.SC.(ENG.), M.I.MECH.E., M.I.LOCO.E., has been appointed chief mechanical and electrical engineer, Scottish Region, British Railways. He was formerly principal assistant mechanical and electrical engineer at Swindon, where he began his career in 1923. After completing his training in the workshops he transferred to the drawing office, and in 1937 became assistant to the carriage and wagon works manager. After two years' war service he was released to return to Swindon where he was carriage and wagon works manager in 1947 and locomotive works manager a year later. Mr Roberts was appointed carriage and wagon engineer, Western Region, in 1951, and, in 1957, when the Carriage and Wagon Department was merged into that of the chief mechanical and electrical engineer, he became principal assistant in the combined department.

Mr J. E. Shepherd, M.I.E.E., A.M.C.T., manager of No. 6 sub-area of the North Western Electricity Board since 1948, has retired after 48 years' service in the electricity supply industry. His successor is **Mr J. Mills,** A.M.I.E.E., M.I.MECH.E., A.M.C.T., M.INST.F., as we earlier reported. Mr Shepherd started his career with the Rawtenstall undertaking of which he became chief engineer in 1931. Seven years later he took up a similar position at Barrow-in-Furness, a post he held till 1948.

New members of the board of A. J. Flatley Ltd, Mr R. B. Pursey, extreme left, and Mr G. D. Broadfoot, right, with Mr A. J. Flatley in the centre

Mr H. A. P. Caddell

Mr D. Holt

Mr R. H. Rockliffe

In the plan of the Midlands Electricity Board for the amalgamation of its South Staffs and North Worcs sub-area with the Wolverhampton and district sub-area (to which we referred on 24 Nov.) the Board now announce that **Mr H. A. P. Caddell,** M.A., M.I.E.E., has been appointed manager-designate of the new combined sub-area. As from 1 April he will be relinquishing his present post as manager of the South Staffs and North Worcs sub-area to devote himself to the preliminary work involved in the organisation of the new sub-area. **Mr D. Holt,** B.SC.(TECH.), M.I.E.E., manager of the Wolverhampton and district sub-area, while retaining that position, is also to be acting manager of the South Staffs and North Worcs sub-area pending the completion of the amalgamation, expected to become fully effective in 1963. Mr Caddell has held his present position since 1958 and prior to that was manager of the North Staffordshire sub-area. He started his career with the SWS Electric Power Co. and was assistant district manager at Dudley from 1930 to 1933. After three years at headquarters as commercial assistant he was district manager at Evesham from 1936 to 1939 and at Redditch from 1939 to 1945. He then became manager of the company's Central Division until nationalisation of the industry. Mr Caddell was a member of the load analysis committee of the ERA from 1945 until its dissolution in 1948. A past chairman of the North Staffs sub-centre of the IEE, he has been a member of the District JIC and of its negotiating committee since 1955. Mr Holt has been manager of the Wolverhampton and District sub-area since May, 1955. Prior to 1948 he was with the Walsall Corporation undertaking for 15 years, ultimately as engineer and manager, in which capacity he was also a member of the West Midlands JEA. Following the formation of the Midlands Electricity Board he served as manager of the Walsall and Wolverhampton districts until his appointment as manager of the Central Gloucestershire sub-area in January, 1950. During his five years there he was responsible for an extensive rural development programme.

Mr E. T. Card has been appointed a director of Electrothermal Engineering Co. Ltd.

Mr Peter Jardine has been appointed managing director of J. G. Statter and Co. and Minerva Mouldings Ltd., both members of the Metal Industries group. He succeeds the late **Lt-Col G. S. Marston.**

Mr H. F. Bibby, B.SC.(TECH.), A.M.I.E.E., has been appointed general manager of Associated Electrical Industries Export Ltd. Previously he was director of administration to the company, and earlier was general manager of Metropolitan-Vickers Export Co. Ltd.

Johnson and Phillips Ltd. anounce changes in their home sales organisation. **Mr J. C. Robertson,** D.F.H., M.I.E.E., previously London branch manager, has been appointed sales manager (home) and will be asisted by **Mr C. W. Cawte,** B.SC.(ENG.), A.M.I.E.E., who continues as sales manager (cables), and by **Mr R. L. Stanley,** D.F.H., A.M.I.E.E., who becomes sales manager (plant). **Mr B. E. Leeson** having reached normal retiring age has, at his own request, been relieved of his sales management duties but will continue in a senior sales capacity particularly relating to the sale of switchgear in certain areas. **Mr R. A. Jones,** A.M.I.E.E., has succeeded Mr Robertson as London branch manager.

The Midlands Electricity Board anounces that **Mr R. H. Rockliffe,** A.M.I.E.E., A.C.T.(B'HAM), is to become its Birmingham area engineer, in succession to **Mr A. C. MacQueen,** M.I.E.E., who will be retiring later this year. Mr Rockliffe, who is at present manager of the Board's South West Birmingham district, was educated at the Birmingham Central Grammar School and the Central Technical College. After serving his apprenticeship he joined Birmingham Corporation Electricity Supply Department in 1946 as a graduate trainee. He held progressive posts on the engineering staff of the Birmingham area of the Midlands Electricity Board before being appointed deputy to the Area Engineer, Mr MacQueen, in 1955. In March, 1960, he became manager of the South West Birmingham district.

In regard to our note last week concerning the new appointment of **Mr F. H. Birch,** B.SC.(ENG.), M.I.E.E., D.F.H., we should make it clear that he was with the Technical Department, SE England district of the CEB from 1938 to 1940, and with the Technical and Research Department at head office from 1940 to 1948. The IEE paper on "Turbo-Generator Performance," of which he was joint author, was read in 1959.

OBITUARY

Mr J. E. Nelson, M.I.E.E., who was chief executive officer of the Merseyside and North Wales Electricity Board until retiring in Sept. 1948, died on 12 February, aged 80. Prior to joining that Board he was director, general manager and engineer to the Mersey Power Co. Ltd., which he originally joined at its inception in 1911. He was a past-chairman of the IEE Mersey and North Wales Centre, and of the N.W. England and N. Wales area committee of EDA.

Mr E. F. Fudge, C.B., C.B.E., formerly an Under-Secretary, Ministry of Fuel and Power, died on 23 Feb., aged 73.

Mrs Ida Reynolds, wife of Mr R. D. Reynolds of EDA, and an early member of the EAW, died on 24 Feb.

BOOKS RECEIVED

Electrical Theory on the Giorgi System, by P. Cornelius. Translated from Dutch, this is a general introduction to applications of the MKS system to electrical theory. Published by Cleaver-Hume Press Ltd., 187 pages, 8½ in. by 5¼ in. Price 32s.

A History of Flow Measurement by Pressure-Difference Devices. Collection of articles formerly published in the *Instrument Engineer*, tracing development in this field. Published by Geo. Kent Ltd., 52 pages, 11 in. by 8½ in. Price 10s.

Soviet Technology Digest. This is a monthly summary of USSR technical literature, which takes note as well of publications of some other Eastern European countries. As a minimum, titles and authors are noted; some articles are abstracted. Published by Pergamon Press Ltd., 150 pages, 9½ in. by 6½ in. Annual subscription £10.

Tube and Semiconductor Selection Guide, 1960/61, by Th. J. Kroes. List of valve types with near equivalents in Philips Electrical range, backed by brief information on Philips' types, and extensive glossary in French, German and Spanish. Published by Cleaver-Hume Press for Philips' Technical Library, 160 pages, 9¼ in. by 6 in. Third edition. Price 12s 6d.

Symposium on H.V. Power Systems and Protection Against Surges. Collection of papers presented to Golden Jubilee Symposium organised by the High Voltage Engineering Section of the Indian Institute of Science. Published as a special number of *Current Engineering Practice*, "India House," Post Box No. 1374, Bombay 1. 202 pages, 11 in. by 8½ in. Price 15 Rupees.

Future of fusion power

PROF. BLACKETT SURVEYS PATH TO POWER GENERATION

IN the face of the slow progress of the past few years and the many serious difficulties encountered, an attitude of mild pessimism exists in many quarters about the prospects of developing economic methods of power generation based on fusion (thermonuclear) reactions. This judgment was expressed by Prof P. M. S. Blackett, M.A., F.R.S. (professor of physics, Imperial College) when he delivered the Forty-seventh Thomas Hawksley lecture to the Institution of Mechanical Engineers last week.

Much of Prof Blackett's lecture was devoted to a review of existing ideas on the equipment in which fusion reactions can be induced to take place. He confessed early on, his intention of introducing nothing new in this respect; indeed, little that is of outstanding novelty or importance has been published since the 1958 Geneva convention. However, for his engineering audience, Prof Blackett had much of interest to offer in a sketch of the future path along which development of economic nuclear power was likely to proceed.

Four Steps to Success

He suggests there are four main steps to be taken on that path. The first is to construct a device which will give an adequate number of neutrons arising from completely thermalised heavy hydrogen ions (i.e., from true thermonuclear reactions), to make possible a sensitive diagnosis of the physical conditions of temperature and particle concentration in the plasma. Such a device might be called "a diagnostic fusion reactor." (Plasma is the term for the tenuous, completely ionised, hot gas in which thermonuclear reactions occur.)

For such devices to be useful, it is necessary that neutrons arising from reactions due to directly accelerated ions should be absent. In most devices so far made, any neutrons of the "right sort" have been diluted by a much greater and uncertain number of neutrons of the "wrong sort." There is the further complication that the wrong sort of neutron is especially likely to appear when rapidly changing magnetic fields are present, as they are in many of the devices so far designed. Rapid magnetic changes lead to large electric fields, and when particle concentration is low, as it must be in plasma, there are long free paths before collisions, and so acceleration to high energies.

Assuming an output of 10^{10} neutrons per pulse (or per second for a continuously operating device) as the minimum for a useful diagnostic reaction, fusion energy output is about 0·01 Joules. To produce this might necessitate power input of 1 MJ so that energy efficiency of a diagnostic fusion reactor would be about 10^{-6}%. Various devices in this country and in America have come somewhere near this requirement, but none has satisfied it. For example, if all the neutrons from ZETA, about 10^6 per pulse, had been of thermal origin—which they were not—its fusion efficiency would have been less than 10^{-10}%.

The second step to be considered is the construction of an improved device which would act as a convenient source of neutrons and would be at least as efficient as direct acceleration of deuterium and tritium ions by an electrostatic machine. That is, greater than about 1% on an energy basis. For such a "neutron source fusion reactor" 10^{16} neutrons per second would thus be produced for 1 MW of input power. Even this achievement would mean an improvement of efficiency of 10^{12} over the best existing diagnostic fusion reactor. Moreover, it is likely that, considered as a source of neutrons, such a machine would for nearly all purposes be inferior to a conventional fusion reactor.

The next step after this would be to build, at any reasonable cost, a non-economic power fusion reactor, that is, one having efficiency greater than unity and so an increased efficiency of more than 10^8 over the assumed diagnostic reactor. Prof Blackett considers it quite impossible to be sure what such a power reactor might be like, or how large it would be. As knowledge of basic plastics physics advances, ideas are likely to change considerably; it may even be proved that it is not possible to build such a reactor on a reasonable earthly scale. However, it is pretty certain that any successful reactor will be very large.

Research Programme

Turning to the practical problem of planning a rational research programme, Prof Blackett suggests it is well to forget about his four hypothetical steps except for the first, and to concentrate instead on learning "a great deal more about the fundamental physics of plasmas." The initial attempt to make a big machine, of which ZETA was one example and American and Russian experience provides others, which might have taken the world in one step a long way towards a power-producing reactor, has to be recognised as having failed. In the professor's opinion it was a worth-while exercise—the analogous gamble on the first fission reactor succeeded. However, for prevailing circumstances the emphasis ought to change to the energetic investigation of the relevant physics, combined with inventive ingenuity, mostly on a relatively modest scale of material.

Medium-scale Experiments

Experience in recent years, he suggests, has shown the value of moderate-sized apparatus, with a capital cost of £50,000 or so, and with a team of half-a-dozen physicists and engineers. The subject is wide open for novel ideas and for new experimental discovery.

Throughout this consideration of the future of controlled fusion reaction development, Prof Blackett emphasises the part to be played by experimentation, as distinct from theoretical investigation. Although the latter can be powerful, little in the whole field of plasma physics has been predicted and much has been discovered as the result of experiment.

North Scotland Supply, 1960

H.E.B. SUFFERS FROM DRY YEAR

BRITAIN'S wet summer of 1960 missed out in the one part of the country where the rain might have been welcome—the north of Scotland. The annual report of the North of Scotland HEB, published last week, notes marked deficiencies of rainfall during the year, with water flow much below expectation, only 81% of average. That meant more thermal generation and increased expense for the Board, which none the less produced a credit balance of £222,596 on the year's operations, the turnover being £15,505,125.

The comparatively dry weather had one good effect for the Board; it permitted fast progress with constructional schemes. At present, the Board has a total capacity of 572·2 MW under construction, the work involving an estimated annual output of 919 million kWh. Schemes involving a further 555 MW capacity and 1,718 million kWh annual output are in various preparatory stages.

Much is heard about the cost of the Board's schemes, and the Board itself is led to complain about one aspect of this—high interest rates. At the beginning of the year under review it was paying for new capital at 5½%. From August onwards the Board, in common with other nationalised bodies, was paying 6¼%. At such rates, the Board was finding that interest charges absorbed more than half the revenue.

Another section of the report reflecting criticism of the financial basis of the Board's schemes is a table listing original estimates and final realised costs of completed hydro schemes. The following is the list:

Scheme	*Orig. estimate and year*		*Completion*	*Approx. final cost*
Tummel-Garry & Gairloch ...	1944	£6·45m	late 1959	£18·5m
Tummel-Garry (Amendments)	1954	£0·10m	1960	£ 0·11m
Shira	1946	£3·15m	late 1959	£ 8·2m
Glascarnoch etc.	1947	£8·70m	late 1959	£18·5m
Orrin	1954	£4·55m	1960	£ 4·60m
Shin	1953	£7·20m	1960	£ 7·60m

Construction and Operation

In view of the Frejus disaster in France, the Board arranged for special inspections of all their major dams. "Very favourable" reports were received. So far as thermal plant is concerned, the year's report makes despondent reading in relation to new methods. The Dundee gas turbine was dismantled, and at Altnabreac the experimental peat-burning plant was shut down to a care and maintenance basis in June, because of difficulty in controlling combustion of the peat. Whether necessary modifications will be made depends on whether the Development Commissioners continue a grant-in-aid of the work.

The water shortage already mentioned represented to the Board a loss of 456 million kWh over the year. Reservoirs were heavily drawn down, and storage was only about 45% of capacity during August and again at the end of October.

In transmission, the worst weather was during the middle of January, when icing put out of action some lines over high passes. There was a series of widespread lightning storms during the summer. Altogether, 66 system faults occurred at 132 kV, of which 57 were overhead line faults, giving an incidence of 3·01 faults/100 circuit miles. 88% of faults were cleared correctly by protective gear.

Commercial

Average price paid per unit by the Board's consumers during the year was 1·763d, and sales were 12·7% higher than in 1959. Sales of domestic appliances by the Board reached a new record value, £1,014,081; and there was extensive evidence of what the report calls "the marked preference for all-electric housing."

Development and Research

During the year, the Board began an experiment of using erosion-resistant coatings of synthetic rubber to combat the effects of cavitation on turbine runners. Another experiment involved thermal rating tests on alternators running dewatered as synchronous reactors. This has shown that the machines can supply a greater amount of line charging current than was expected; negative excitation has to be applied to make this possible.

Work continued on the detection of o.h. line faults by h.f. pulse techniques, and several transient faults and ice conditions were detected on conductors in the Corrieyairack Pass. As a result of experience, plans were made for installation of a commercial version of this Ferranti equipment at Fort Augustus during the present winter.

N of S HEB Results for 1960

		1960	1959
Commercial			
Units sold			
Domestic	million kWh	699	618
Farm	million kWh	131	118
Commercia	million kWh	327	287
Industrial	million kWh	407	369
Public lighting...	million kWh	17	16
Traction	million kWh	—	—
To S of S EB	million kWh	565	550
Total	million kWh	2,167*	1,971*
Number of consumers	million	0·393	0·384
Engineering			
Generation			
Steam capacity	MWi	133	133
Hydro capacity	MWi	875	866
Diesel capacity	MWi	45	48
Total capacity	MWi	1,052	1,047
Energy generated	million kWh	2,435	2,196
Transmission, etc.			
OH lines	circuit miles	14,644	14,282
UG lines	circuit miles	2,780	2,675
Financial			
Income			
Sales of elec.	£m	15·46	13·86
Surplus on cont. & sales of fittings	£m	0·02	0·13
Expenditure			
Generation and Purchase	£m	8·78	8·02
Trans.	£m	1·28	1·22
Distn.	£m	3·38	3·24
Cons. service	£m	0·22	0·12
Management	£m	0·71	0·75

*Includes units used in construction of h.e. schemes

new products and appliances

High vacuum variable capacitors

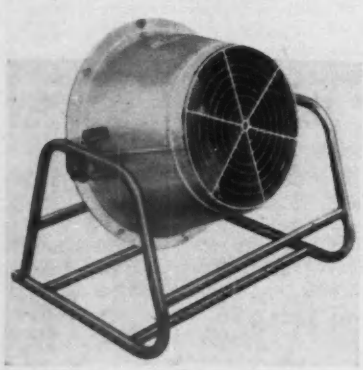
THE recent introduction of a range of high-vacuum variable capacitors gives to the circuit designer not only much greater compactness than comparable air-dielectric types, but also a reduction in stray capacitance and inductance. Five types are available, three rated at 15 kV covering capacitance ranges between 5 pF and 80 pF. The other two, rated at 8 kV and 10 kV, cover the range 5·5 pF to 206 pF. Each capacitor is made up of a series of overlapping concentric cylinders, the effective "plate" spacing being only one-tenth that of an air-dielectric type. Metal bellows, which form part of the vacuum-tight envelope, also transmit axial movement to the cylinders necessary to vary the capacitance. Overall dimensions of the largest unit available is only 9·5 in. by 3·5 in. *English Electric Valve Co. Ltd., Waterhouse La, Chelmsford, Essex.*

Refrigerated fish cabinet

AUTOMATIC defrosting and low electricity consumption are two features of a fish refrigeration cabinet by Lec. Holding approximately 20 stone of wet fish the "Fish Keeper" incorporates a condensation drain dispenser to remove water from the interior. The six galvanised welded steel drawers are set on rollers and each is provided with a safety stop. Both door and cabinet are fibreglass insulated and the unit is equipped with thermostatic control maintaining required temperatures in the storage compartment. *Lec Refrigeration Ltd., Bognor Regis, Sussex.*

Operator cooling fan

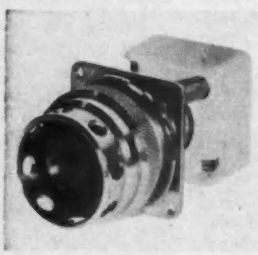
DESIGNED specifically for improving the comfort of operatives working in the vicinity of furnaces, steam raising plant and other industrial "hot spots," a range of transportable ventilating fan units has been announced. These incorporate a cast-aluminium alloy axial-flow impeller, powered by a totally enclosed electric motor, said to provide a directional stream of cooling air. The fans are available with either tripod or cradle mounting and having discharge aperture diameters of 22 in. or 18 in. *W. G. Cannon and Sons Ltd., 38a St. George's Drive, S.W.1.*



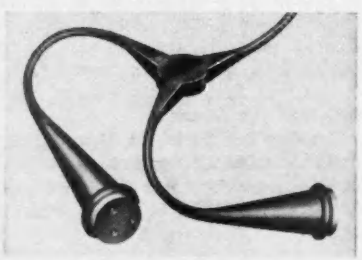
Cradle-mounted cooling fan by Cannon

Panel-mounting indicator lamps

SLIDE-ON solderless terminals are a special feature of a new range of panel mounting indicator lamp assemblies. These are available with ratings of 6 W, 10 W and 15 W and can be supplied with either a glass retaining bezel or one of the metal guard-ring type for industrial applications. Normal soldered-type terminals are also offered as an alternative. The assemblies have a chromium-plated finish and are said to be splash proof. *Lancashire Dynamo Electronic Products Ltd., Rugeley, Staffs.*



◀ *Lancashire Dynamo panel-mounting indicator lamp with guard-ring*



Nettle flexible joint moulding with socket connectors ▶

Philips withdraw shavers

PHILIPS Electrical Ltd. withdrew their Philishave Jet dual-volt and standard models on March 1st, which suggests the possibility of a new range. *Philips Electrical Ltd., Shaftesbury Avenue, W.C.2.*

Cable junction flexible moulding

TO provide multiple mobile socket-outlets for use on industrial sites, a flexible cable junction moulding has been produced having provision for one inlet cable and two or three outlet cables. The moulding, which is of rubber or neoprene, ensures good mechanical clamping and a weatherproof joint. The outlet cables can be terminated with "Type C.133" 5 A weatherproof socket connectors (also supplied by the makers), connection to the main supply being via any suitable three-pin plug fitted to the inlet cable. Complete joint and outlet connector assemblies, with cable lengths to suit individual requirements, can be supplied to order. Trade price, which includes moulding cables to the junction, but excludes cost of cable and socket connectors, is 12s 8d. *Nettle Accessories Ltd., Warren St, Stockport, Cheshire.*

SMALLER 'FRIDGES FOR MODERN HOMES

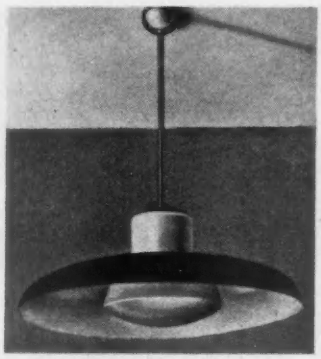
A MARKED accent on the smaller refrigerator with several models suitable for unit building in the smaller kitchen is a most noticeable point of the models being launched this year when the industry is trying to increase the saturation point to more than 22%, last year's figure. A switch to polystyrene plastics interiors has become general and the magnetically sealed door is popular. General Electric is launching a 4·3 cu ft compressor model priced at £65 10s including tax. The refrigerator can be defrosted overnight without removing any of the contents and when the cycle is complete the food remains at a safe temperature until the control is reset. The unit has three storage shelves and a salad crisper as well as a storage compartment for frozen food capable of holding 17½ lb. The company have also produced a 2·6 cu ft absorbtion model with a 168 cu in. compartment for storing frozen food.

In the cheaper price range, Morphy-Richards have added an in-built unit to their Astral range. Although it is only 22 in. deep by 21 in. wide, this model has a 1·6 cu ft capacity and sells at £32 10s.

Two newly designed models enter the Hotpoint range, one with a 5 cu ft capacity and the other, slightly smaller, giving a cubic capacity of 3·7 ft. Both are set on rollers for ease of movement and the larger model has a magnetically sealed door, and a choice of bright colours in the vitreous enamelled table tops, available as an optional extra.

Designed for the smaller kitchen, Electrolux have produced a 1·6 cu ft 'fridge to stand on legs, or on top of a unit cabinet or to be fixed to the wall. Others in their range include an 8 cu ft model with a large salad drawer, ample shelf space and a bottle compartment in the door, and a larger unit with 10 sq ft of shelf space.

Of the six English Electric models on the market this year, the newest refrigerator is the Slimline 41 with full width freezer having a temperature range of 15°F to below 0°F and taking up an area of only 21 in. wide by 24 in. deep.



Lighting pendant by Candell

New lighting company

ENTERING the lighting field with a range of tungsten fittings are Candell Ltd., and among their latest models is a pendant mounting with a satin etched opal glass. A dish-shaped reflector fits over the diffuser giving good downward lighting and at the same time ensuring an even spread over the ceiling from the upper portion of the glass. The reflector is enamelled white on the inside with either black, red or yellow external finish. The pendants are available in chrome or bronze and fittings cost £5 18s 4d for lamps up to 150 W and £6 2s 4d for 200 W lamps. Both prices include purchase tax. *Candell Ltd., Riverside Wks, Broadmead Rd, Woodford, Essex.*

Fully automatic dish-washer

PRICED at 95 gn, the Dishlex Mobile fully automatic dish-washer will be launched on the market early this month. It has two interior p.v.c.-covered racks for crockery and the lower one may be used in a separate operation for washing saucepans. Two 1·3 kW thermostatically controlled heaters raise the water temperature to 140°F for both washing and rinsing operations and the manufacturers claim they also provide hot air for power drying the dishes.

Conveniently mobile, the machine is set on castors and is connected to the normal household plumbing by a hose. The outlet pipe is served by an electrically driven self-contained pump and a special safety feature is that the washer will not operate unless the lid is closed. The outer cabinet is of white stove-enamelled sheet steel with a dove-grey vitreous enamel top. *Dishlex (G.B.) Ltd., 22 Golden Sq, W.1.*

Light-weight pocket lamp

A 4½ oz pocket lamp has been added to the existing range of Exide lamps and torches. Finished in bonded plastics, the 2FT11A is available in red, blue or lemon and takes two Exide Drydex T.11 batteries. It sells at 4s including purchase tax. *Chloride Batteries Ltd., Exide Works, Clifton Junction, Swinton, Manchester.*

Air-break switchgear

TO meet demand for flush-fronted switchgear where space is limited and heavy-duty conditions prevail, George Ellison Ltd. have introduced a range of air-break switchgear for 800 A certified to ASTA No. 16, for 31 MVA class A and 26 MVA class B at 415 V; and 1,600 A awaiting certification. Each unit consists basically of flush-fronted sheet steel cells housing horizontally isolated double-tiered circuit-breakers or off-load isolators and a central metering panel. A more extensive description of the new range will be given next week. *George Ellison, Perry Barr, Birmingham 22B.*

THREE NEW HOOVER PRODUCTS

JUST as the EDA and ASEE exhibitions are falling due comes the announcement of three new Hoover domestic appliances: a fully automated washing machine, an improved "Hoovermatic" and a completely new vacuum cleaner, the "Hooverette." As all of these appliances will be shown for the first time at the EDA exhibition this week, they are included in the survey on page 327.

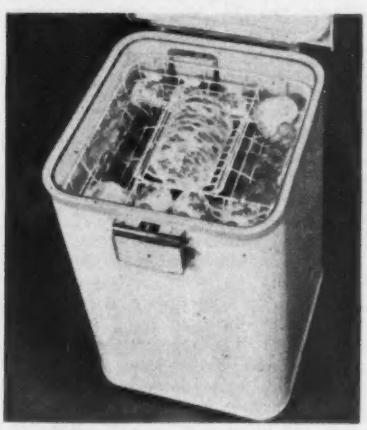
It is rather difficult these days to be original in washing machine design, but Hoover has certainly done this in the "Keymatic." Following the trend of fully automatic washing and spin-drying sequences with separate programmes for different classes of material, the "Keymatic" breaks new ground by being the first in this country to adopt the angled washing tub combining the functions of tub and spin dryer. Programming is effected by a novel rectangular plastics "keyplate" with bevelled edges which can be inserted in eight different ways into a slot at the top right-hand of the machine. Each bevelled edge is marked with the name of a class of fabric and, by placing the keyplate in the slot with one name uppermost, the temperature, washing, rinsing and spin-drying cycles are automatically programmed to suit. A visual indicator, in the form of a white line on a red background, marks the progress of the operation.

The keyplate of the new "Keymatic" washing machine

The "Keymatic," which takes 8lb dry weight of clothes, is 32½ in. high by 24½ in. wide and 26 in. from front to rear, and is mounted on castors for easy handling. The maximum electrical load is 3·5 kW and safety devices ensure that access to the tub is not possible until the tub is at a standstill. The price, including purchase tax, is £120 15s.

The popular "Hoovermatic" has also been redesigned to incorporate a thermostat and timer, which are located on a sloping panel at the front of the machine. The price is £89 5s.

The "Hooverette" is attractively styled in two shades of porcelain blue with pearl white latches and red slide switch and embodies a paper "Disposall" dust bag. The price, also including purchase-tax, is £13 13s. It is shown on page 327. All three appliances will be marketed on 6 March. *Hoover Ltd., Perivale, Middx.*



"Dishlex Mobile" automatic dish-washer

Above is the new, fully automated "Keymatic" washing machine. The position for inserting the keyplate can be seen. On the right is the new "Hoovermatic"

Ultrasonic cleaner

CLAIMED to be the largest of its kind ever manufactured in this country, ultrasonic plant recently installed for cleaning polishing compound from cutlery, incorporates an ultrasonic generator delivering peak power of 4 kW at 40 kc/s. The plant consists of three stainless steel tanks housed in a frame, which also carries the control equipment, with the generator mounted on an adjacent wall. In the first stage of cleaning the articles are subjected to ultrasonic waves while immersed in warm trichlorethylene solvent. This is followed by a static immersion rinse and final drying, solvent vapour being condensed for recovery. This particular equipment is said to handle 350,000 pieces of cutlery in a week. *Kerry's (Ultrasonics) Ltd., Warton Rd, E.15*

New process timer

THE introduction is announced of a new automatic timer designed for common industrial timing applications requiring single circuit control. Known as the "STAR" unit, 15 timing ranges are available covering 0 to 12 sec up to 0 to 24 hr. The device is driven by a miniature synchronous motor through an electro-magnet clutch and time is preset by rotating the bezel. Price is £12 18s. *Electrical Remote Control Ltd., Bush Fair, Harlow, Essex.*

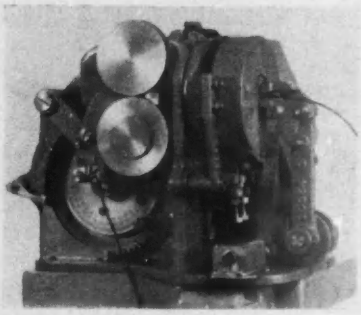
FOIL WINDING AND WIRE TRIMMING

INTEREST in the use of aluminium foil strip windings for transformers, which has been growing in recent months, will doubtless be further stimulated by the availability in this country of a winding machine for applying this new technique. Such a machine is manufactured by the Globe Tool and Engineering Co., of America, and is one of two industrial machines recently introduced from abroad which have specific applications in electrical manufacture. The foil winding machine, several of its kind having already been built for American transformer manufacturers, is said to be suitable for the production of distribution-type transformers. It can handle various foil thicknesses, as well as interleaving paper or other types of sheet insulation, in strip widths of up to 22 in.

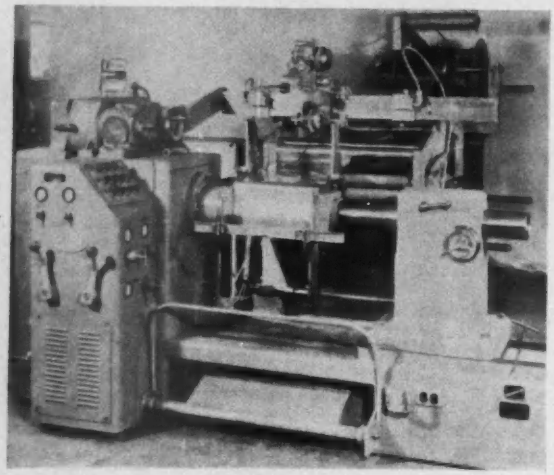
From Sweden comes a wire-preparing machine for use with single-stranded plastics insulated wire having overall diameters in the range 0·04 in. to 0·16 in. The machine not only cuts and counts predetermined lengths of wire, but also strips insulation from either end and twists the bare ends ready for termination. Wire is fed from a coil placed beneath the machine, through rollers, into a rotating head incorporating cutting and stripping jaws. The standard stripping length is 0·3 in. to 0·4 in. and the full range of cutting lengths available can be adjusted between 2 in. and 30 ft. The machine has an output of 240 to 1,500 finished lengths/hr.

George H. Alexander Machinery Ltd., 82-84 Coleshill St, Birmingham 4.

Vicsteels Ltd., Craven Hse, 16 Northumberland Ave, W.C.2.



▲ *Swedish wire cutting and insulation stripping machine by Lumalampan of Stockholm*



◀ *To meet the latest development in transformer design, the Globe Tool and Engineering Co's aluminium foil winding machine*

From the new Atlas "Atlantic 2" range, a twin tube batten with, in descending order, AAB, AAC and AAE diffusers and the AAL angle reflector

New Atlas "Atlantic 2"

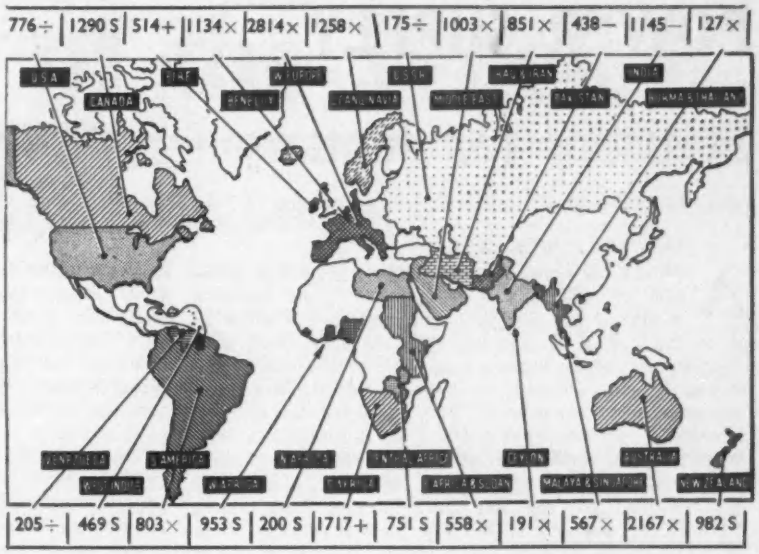
THE new Atlas "Atlantic 2" range, just released, comprises 12 batten fittings of improved design with a choice of nine diffusers and reflectors for each. The battens are for 4 ft 40 W, 5 ft 80 W and 8 ft 125 W tubes, either single or twin, switchstart or quickstart.

The four diffusers offered are the AAB series, opal acrylic with a bold reeded pattern and clip-in moulded end-plates in white or blue, the AAC series, plain opal acrylic diffusers with cemented end-plates, the AAD series, opal polystyrene side panels with louvred polystyrene diffuser and the AAE series, in which the diffuser is a single plastics extrusion, incorporating opal side-plates and a clear reeded bottom.

The five reflectors are the AAL series, metal angle reflectors in "Miracryl" finish for chalkboard or similar use, the AAO series, one piece translucent acrylic opal trough reflectors, series AAW, closed-end metal trough reflectors also in "Miracryl" finish, series AAY, open-end metal reflectors and series AAZ, open-end reflectors in metal with large flared slots to give upward lighting. Prices of the new fittings are substantially below those of the "Atlantic 1" range which they supersede. For example, the twin 125 W quickstart with AAB diffuser is £23 3s 1d, as compared with £31 7s 1d, both including purchase tax. *Atlas Lighting Co., Thorn Hse, St. Martin's La., W.C.2.*

Distribution of Exports in £'000's Sterling

×=over 25% increase
+=10% to 25% increase
S=10%+ to 10%−
−=10% to 25% decrease
÷=over 25% decrease
on previous year's figures.



EXPORTS IMPORTS *January*

THE Electrical Industry has started the 1961 export drive in grand style—achieving the record total of £27,119,101 for the items listed in our table. This is £85,498 higher than the previous best — £27,033,603 recorded for last November. It will be seen that the increased trade is reflected in various sections of the industry. Exports of the heavy plant side, for instance, were £1,360,000 up on a year ago, largely due to substantial shipments of transformers and switchgear. But the domestic appliance total of £2,797,354 is over £365,000 down on the previous month, a decrease in which most items shared.

Compared with a year ago, cable exports were also down, but it must be remembered that the 1960 figure includes over £1 million in repect of submarine telephone cable dispatched to the USA.

The Radio Industry again topped the £5 million mark, of which £2,363,008 was in respect of radio communication, navigational aid and radar equipment.

Australia was our best customer for the month, with a total of £2,167,643, South Africa following with £1,717,243.

On the imports side, where the £5,262,934 total was still £300,000 below the highest figure, imports of radio gear at £1,552,324 included £30,077 for complete transistors and £56,832 for domestic radio receivers. While imports of lighting fittings were also maintained, those of refrigerators and washing machines declined once again.

Description	Exports Value (£)		Imports Value (£)	
	Jan. 1960	Jan. 1961	Jan. 1960	Jan. 1961
Generators				
Diesel up to 200 kW	480,971	430,154		
Diesel over 200 kW	157,855	309,012		
Steam turbine driven	75,527	10,875		
Water and gas turbines	593,491	696,034	56,815	111,116
With i.c. and other prime movers	15,162	216,522		
Generators up to 200 kW	124,947	94,857		
Generators over 200 kW	50,745	69,615		
Generator parts	1,081,983	922,681		
Motors, f.h.p.	285,232	383,784		
Motors 1-250 h.p.	459,726	551,794	142,786	252,825
Other Motors	406,354	405,790		
Motor starters and controllers	269,533	426,972		
Convertors and rectifiers	72,061	92,350	112,582	196,204
Transformers	660,722	1,051,756		
Switchgear, to 200A, mv	440,644	776,044	160,209	219,871
Switchgear, other	1,194,269	1,291,095		
Total, Electrical Plant	*6,369,222*	*7,729,335*	472,392	779,716
Batteries, primary and parts	510,173	792,085		
Lamps filament, over 28 V	102,063	99,665		
Lamps filament, under 28 V	34,575	43,116	93,852	117,388
Fluorescent tubular lamps	59,880	83,771		
Other lamps	75,427	111,599		
Radio and electronic gear	3,709,283	5,128,974	1,319,397	1,552,324
Telephone and telegraphic equipment	2,192,114	1,699,561		
Cookers	38,205	51,736		
Other cooking appliances and parts	168,902	165,068		
Space heaters	26,333	28,917	124,899	202,348
Water heaters	29,806	42,954		
Other heaters and parts	122,030	161,372		
Electric irons	95,157	84,464		
Vacuum cleaners	154,425	234,329		
Floor polishers	90,426	78,010		
Food mixers	45,551	61,072		
Washing machines, domestic	623,532	673,228	366,888	92,540
Dryers	66,391	26,856		
Washing machine and dryer parts	115,226	136,495		
Domestic refrigerators and parts	615,910	669,257	218,482	127,471
Other appliances and parts	285,288	383,596		
Total, Domestic Appliances	*2,477,182*	*2,797,354*		
Portable power tools	241,319	288,346		
Arc welding plant	96,570	101,500	65,033	95,584
Resistance welding plant	23,317	100,267		
Electric furnaces	83,778	87,154		
Signalling apparatus	153,020	142,558		
Commercial instruments	156,973	251,219	83,063	123,085
House service meters	201,545	204,975		
Wiring accessories	203,835	262,132		
Fans	116,658	171,227		
Lighting fittings and lanterns	350,053	375,467	138,674	157,358
Other lighting equipment	80,049	96,566		
Telephone and telegraph cable	1,656,643	311,397		
Paper insulated cables	646,270	651,578		
Rubber insulated cables	278,900	345,258		
Thermoplastic insulated cables	324,958	353,326		
Winding and similar wires	146,276	165,535		
Other cables and wires	183,091	274,105		
Total, all cables and wires	*3,236,138*	*2,101,199*		
Accumulators and parts	285,878	437,468		
Insulating materials	247,840	215,114		
Industrial electronic control gear	158,791	202,817	44,805	128,424
Electrical ware	130,425	124,736		
Permanent magnets	53,251	69,895		
All other articles	2,806,502	3,401,001	1,555,673	1,886,696
Total	24,155,861	27,119,101	4,483,158	5,262,934

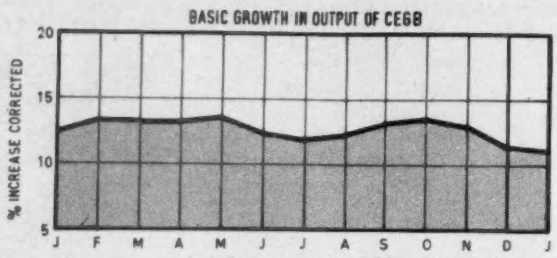
POWER SUPPLY

Statistics for January

A MARKED increase in the rate of growth of units sold by the CEGB is apparent from statistics published for last year and, with two months to go to the end of the financial year, it seems likely that consumption for the current year will rise to about 13·5% above that for 1959-60. In 1954-55, the corresponding increase was 11·9% over 1953-54. This fell to only 5% in 1956-57, but rose again to 10·3% at 31 March last year. Since then, the cumulative increase in units sold has risen fairly steadily from 9·3% in April to 13·8%, at which it has remained for the last three months. Last month the units sent out were 13·3% more than in January, 1960, or rather lower than in the previous six months. After correction for average temperature and number of working days, the increase becomes 11·2%.

Electricity sent out during January by the three most northerly area boards exceeded January last year by more than 16%, and only slightly less than their sales, were the sales of the SSEB and NSHEB.

The electricity generated by the three boards rose to 13,250 million units or 12.9% higher than in January last year. January coal consumption, however, rose by 15.3% over the same period last year to 5,778 thousand tons, while oil consumption rose by 15.6% to 557.4 thousand tons. The lower percentage rise in generation compared with fuel consumed may be due to two factors: poorer coal and the necessity, because of rise in demand, to utilise less efficient plant over longer periods. Electricity sent out by the three boards rose to 12,495 million units in January.



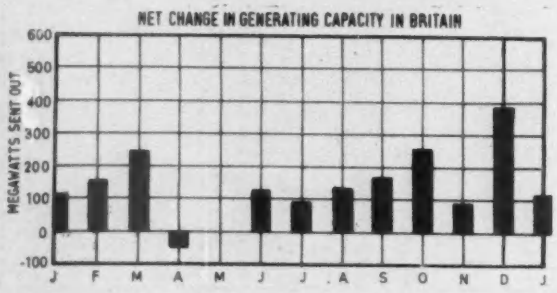
The output capacity of the CEGB increased by 112 MW to 26,883 MW. Both the SSEB and the NSHEB generating capacity remained unchanged at 1,763 MW and 1,041 MW, respectively. Only one set was commissioned during the month. It was the first set at Rugeley (Midlands Division). The turbo-generator, built by Parsons and rated 120 MW, is supplied with steam from the No. 1 boiler, built by Babcock and Wilcox and rated 860 klb/hr. Rugeley will eventually have five 120 MW sets.

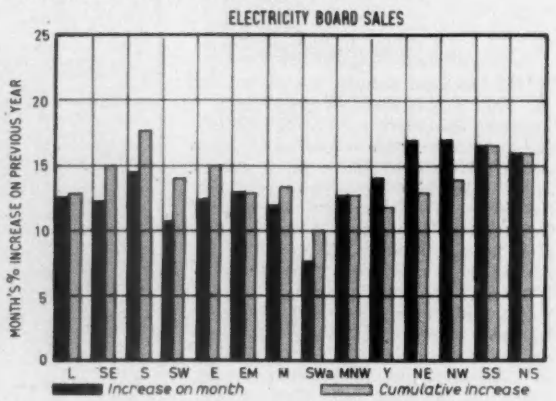
Last month it was incorrectly stated that the 1,400 klb/hr boiler at High Marnham was built by Foster Wheeler. Actually, it was built by International Combustion. Foster Wheeler, however, supplied the Northfleet No. 3 and Drakelow "B" No. 8 boilers rated 860 klb/hr.

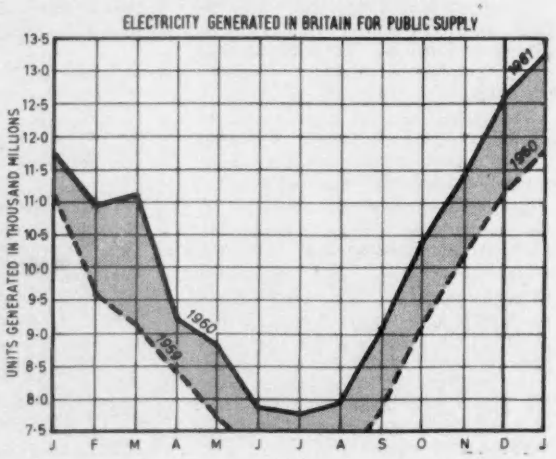
Electricity Board Sales Progress in January

Board	Electricity sent out in millions of units	% Increase January 1960
London	1,117·8	12·6
South Eastern	753·6	12·2
Southern	990·8	14·4
South Western	426·8	10·7
Eastern	1,170·7	12·3
East Midlands	928·2	13·1
Midlands	1,231·6	11·9
South Wales	583·5	7·7
Merseyside and N. Wales	681·1	12·8
Yorkshire	1,211·4	19·0
North Eastern	659·0	16·9
North Western	1,185·5	16·9
Direct Supplies by CEGB	336·7	2·2
CEGB Total	11,276·7	13·3
South of Scotland	915·6	16·5
North of Scotland	211·0	15·9

Table excludes area board purchases from other sources.







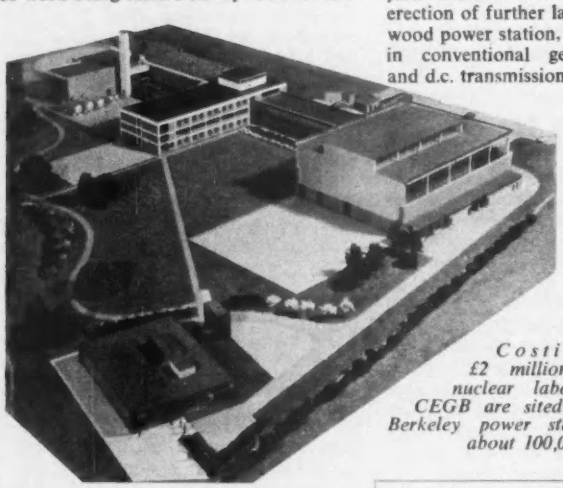
News of the Week

May Opening for Berkeley Labs.

C.E.G.B. PLANS INTERNATIONAL CONFERENCE

INTERNATIONALLY acknowledged experts will attend a conference on nuclear engineering topics arranged to mark the opening of the CEGB's Berkeley nuclear laboratories at the end of May. So far more than 100 scientists from all over the world have accepted an invitation to attend the conference on "Properties of Reactor Materials and Effects of Radiation Damage."

As already announced, the CEGB are erecting a series of laboratories near Berkeley power station, Gloucestershire, at a cost of more than £2 million. Scientific staff of the laboratories, expected to total 350 when complete, will work in close co-operation with engineers involved in operation and maintenance of the Board's nuclear power stations. In addition to operational research, the laboratory programme will include some fundamental research—but the Board claims that there will be no duplication of work being carried out by the UKAEA.



Costing more than £2 million, the Berkeley nuclear laboratories of the CEGB are sited adjacent to the Berkeley power station and cover about 100,000 sq ft

Work at Berkeley will not start from scratch. Various members of the staff have for some time been working in university departments and in various industrial laboratories, and also at a special CEGB laboratory in London where important research on graphite has been in progress for nearly two years.

The Berkeley laboratories will cover an area of some 100,000 sq ft organised into engineering, physics and reactor materials divisions. In the engineering section, a head-room of 60 ft will permit erection of the largest reactor rigs, and there will be facilities for fuel element heat transfer work and general fuel element testing and development.

One of the features of the materials division will be remote handling facilities capable of dealing with about 1,000 fuel elements a year. It will be possible to make a full examination of these to determine causes of failure where appropriate, to predict the onset of failures and also to work towards development of improved types of fuel element. The examination programme will be carried out in conjunction with the UKAEA.

Besides the Berkeley laboratories concerned with nuclear engineering, the CEGB have in hand extensive laboratory buildings at Leatherhead, likely to be completed shortly after the Berkeley project. There is also a tentative plan for erection of further laboratories at Marchwood power station, to carry out research in conventional generation techniques and d.c. transmission.

Financial Interest in Flatley

IN plans for further expansion of the appliance business of A. J. Flatley Ltd. a financial interest has been acquired by the Ocean Trust Co. Ltd. (We reported on 22 Dec. that talks were taking place.) Under the scheme, two executives of Ocean Trust join the Flatley board (as we note on page 336) as part of the scheme for more intensive expansion and diversification in the domestic equipment field. In addition to a new 4½ cu ft refrigerator and a twin-tub washing machine, production of which has started, plans are well advanced for a garbage disposal unit.

With an eye to exports the company is building a factory at Bantry Bay, in Eire, from which production will be concentrated on the continental markets.

Philips Launch into Major Appliances in 1962

INVASION of the UK market in major domestic appliances by Philips Electrical next year is now being planned. A new group within the company to handle such products is already being formed under the commercial management of Mr H. W. Thompson (to whom we refer on page 335). Also in this group are Mr H. N. Pantlin and Mr B. N. Lewis. Philips are already successfully selling major appliances in several other countries, including some in Europe, and have been supplying mixers, heaters and spin dryers here. This latest move follows the acquisition last autumn of the business of Ada (Halifax) Ltd., makers of washing machines and refrigerators as well as machine tools. A little earlier there had been discussions with Morphy-Richards on the possibility of an alliance in that sphere, but the idea was dropped when EMI took over Morphy-Richards.

It is assumed that Philips' venture in the UK will be with washing machines and refrigerators.

BOARDS' APPLIANCE SALES DOWN

SALES of major domestic appliances over Christmas took a sharp knock, judged by the returns of the area electricity boards in England and Wales. Their sales statistics for the whole of December, listed below, show declines for all items except immersion heaters, compared with a year earlier. The biggest reductions were suffered by washing machines, clothes dryers and refrigerators, in that order. Even electric cooker sales had a small setback after several months of steady increases, while the washboiler total declined once again.

In assessing the figures it should be remembered that sales by area boards represent only a part of the total sales throughout the country.

Appliance sales by area boards	Sales in month ended 31 Dec., 1960		Sales in 12 months ended 31 Dec., 1960	
	Total	% change over corresponding period of 1959	Total	% change over 1959
Cookers ...	29,164	− 3·5	339,823	+ 1·2
Water Heaters:				
Immersion	7,355	+17·3	192,441	+ 1·9
Storage ...	4,428	−12·9	67,411	+11·3
Washboilers	3,655	−20·3	56,018	−16·5
Washing Machines ...	6,446	−47·8	111,116	−32·3
Refrigerators	4,762	−21·5	139,291	−15·8
Clothes Dryers ...	8,332	−36·3	57,819	not avail.

Coal and Electricity Interdependent, says Mr. Melling

CEGB and NCB are each fundamentally important to the other stressed Mr C. T. Melling, a member of the Electricity Council, when he addressed the Fuel Luncheon Club last week. Expenditure on coal is the largest item in the supply industry's accounts, while the CEGB is the NCB's largest customer. Current estimates suggest that the CEGB will, in 1970-71, use 66¼ million tons of coal.

A striking feature recently had been the increasing proportion of "untreated smalls" which the supply industry was using. It took 86% (26,000,000 tons) of its coal in this form in 1949 and 94% (40·9 million tons) in 1959. The industry took nearly three-quarters of the total NCB sales of untreated smalls. Electricity, said Mr Melling, made the best of even the worst of the nation's coal.

Mr Melling went on to discuss increase in efficiency of generation and special applications of electricity, notably in the field of electro-heat. Paying special attention to off-peak heating, he estimated that there was now 600 MW of off-peak floor-warming installations and over 500 MW of off-peak block-storage heaters. Both these figures were expanding rapidly and he "hoped that block-storage heaters will yet be available for domestic premises."

Although some critics had suggested that the load factor achieved by the supply industry was very low, in Mr Melling's view the current figure of 48% could be regarded with a measure of pride. In terms of daily load factor on a winter day it was about 70%. These figures compared with a load factor of about 20% for capital equipment in single-shift manufacturing industry and as low as 10% to 15% for a transport undertaking.

COMPUTER RESEARCH

International Computers and Tabulators and the General Electric Co., who in 1956 formed a jointly owned subsidiary, Computer Developments, to develop their specialist knowledge in computers, are now furthering their association through a new company. ICT is forming a subsidiary, ICT (Engineering), 90% of whose nominal capital will be held by ICT and 10% by GEC.

The new company will assume responsibilities now undertaken by ICT's research and design division and by the GEC computer development department, at Coventry. GEC will continue to supply ICT with a substantial proportion of its steadily increasing requirements for electronic equipment. ICT will, on the formation of the new company, take over the majority interest in computer developments.

Another U.S. subsidiary in U.K.

YET another American concern has set up a British subsidiary—the Controls Co. of America, which was formed in 1956 by the merger of AP Controls, Soreny Products and Redmond Motors. Operating from a factory at Sheerwater estate, Woking, the new concern, with the title of Controls Co. of America (UK) Ltd., is already supplying sequence timers to many British manufacturers of automatic washing machines and dishwashers, in addition to flow controls for oil-fired boilers, vending machines, etc. The US company also manufactures a wide range of solenoids and pressure regulating valves, push-button switches, indicator lamps and shaded-pole motors.

Present plans are that the Woking building is the first of a chain of factories throughout Britain. The parent company already has 16 factories in the US, two in Canada, two in South America and one in Holland. The British move follows the establishment of a subsidiary in France and a European administrative headquarters in Zug, Switzerland, earlier this year.

Further Elliott link

ARRANGEMENTS for co-operation in the microwave valve field have been completed by Elliott-Automation Ltd. and Litton Industries Inc., of California, who have jointly formed a £400,000 company, Elliott-Litton Ltd., with offices and factory at Manor Way, Boreham-wood. This concern will assume those responsibilities in Britain and Commonwealth countries and, in the meantime, Litton Industries and Elliotts are investigating ways of further extending their co-operation.

SETTING A GOOD EXAMPLE

FIRST prize-winner in the Kitchen Planning Photographic Competition, organised by the Electrical Association for Women, was Mrs G. M. Stephens, of Perry Barr, Birmingham, wife of the Midlands Electricity Board's assistant secretary (personnel). The second prize-winner was Mr and Mrs J. A. Tatchell, of Billingham, Co. Durham, and the third prize-winner was Mrs M. S. Godden, of Coventry. The winning entry was of a 9 ft square kitchen with electric floor-warming, six 13 A socket-outlets and fluorescent lighting. A refrigerator is housed in a dinette adjacent to the kitchen. Altogether, a layout of which any housewife would be proud; and it was designed by Mr Stephens during the course of a long spell in hospital recently. The second prize-winner's entry showed the arrangement of equipment in a passage-shaped kitchen, 15 ft long by 8½ ft. This had ten 13 A socket-outlets, two fluorescent lights, along with a hatch and two-way opening drawers and cupboards connecting with the dining room. The third prize-winner showed the modernisation of a 1908 house.

Winning entry in the EAW Kitchen Planning Photographic Competition —that of Mrs G. M. Stephens, of Perry Barr, Birmingham. It is a 9 ft square kitchen, with six 13 A socket-outlets, and refrigerator housed in the adjacent dinette

OFFICIAL PUBLICATIONS

North of Scotland Hydro-Electric Board. Report for 1960. HMSO. Price 5s (see page 339).

First-aid (Standard of Training) Order, 1960. Form 2041. HMSO. 4d.

BS Amendments: 214, Enclosed distribution fuseboards for low and medium voltages. PD 4027; 519, Tractive armature d.c.-neutral polar line relays for railway signalling. PD 4017; 561, A.C. line relays, double-element three position (for railway signalling). PD 4018; 903, Methods of testing vulcanised rubber. PD 4024; 1659, Tractive armature d.c. neutral track and line relays for railway signalling. PD 4019; 1698, Mercury-arc rectifier equipments. PD 4000; 1745, A.C. relays for railway signalling: track relays (double-element, two-position) and line relays (single-element two-position). PD 4020; 2818, Parts 1 and 2, Auxiliaries for operation of fluorescent lamps on a.c. 50 c/s supplies. PD 4030; 3274, Tubular heat exchangers for general purposes. PD 3998.

B.E.A.B. Issue its Mark

DOMESTIC electrical appliances approved by the British Electrical Approvals Board will be marked by a modified Kite Mark it was revealed yesterday. The mark, shown alongside, will replace the BSI mark in this field. Also issued yesterday were names of makes of fires, kettles and vacuum cleaners which have qualified for approval.

Last week the General Council of BEAB met for the first time under the presidency of Lord Citrine. Its members include representatives of all sides of the electrical industry and of the Home Office and women's consumer opinion. The Council received reports of progress with the approvals scheme and discussed future plans.

Lord Citrine referred to the growing concern in Britain about consumer welfare and stressed the importance in this respect of BEAB's independence and integrity. The Council was told that the BEAB scheme was necessarily a long-term project. Until large numbers of marked appliances were available in shops—a process estimated to take many months—publicity would be concentrated on information for distributors and retailers.

The BEAB General Council, as indicated in our article last week, is an advisory body. Executive power is centred on a board of management under the chairmanship of Mr T. E. Daniel. On the Council are five representatives of the supply industry, five from BEAMA, three from the BSI Women's Advisory Committee, two each from BSI, EAW, ECA, EWF and IEE and a single representative from the Home Office, the National Chamber of Trade, BSI Consumers' Advisory Council, ECA of Scotland and the NICEIC.

L.E.B. Tariffs up

INCREASES in tariffs, to operate from 1 April, are announced by the London Electricity Board. The unit charge of the domestic and other two-part rates is increased from 1¼d to 1⅓d, and the flat rate for heating and motors is raised by ¼d/unit. There are also changes in the commercial m.d. tariff, including an increase in the kW charge. At the same time the Board are introducing a standard tariff for industrial supplies which will replace all existing industrial tariffs and complete standardisation in the Board's area. There is no change in the off-peak tariff.

These revisions have been accepted by the area Electricity Consultative Council who have expressed regret that the CEGB had not been able to provide in their bulk supply tariff some means of encouraging off-peak consumption.

Explaining the necessity for the increases the LEB points out that increased costs worsen the prospects of the Board in 1961-62 by about £3 million.

RECENT LARGE ORDERS

SIX 3,500 h.p. 333 r.p.m. 11 kV salient-pole synchronous motors have been ordered from the AEI Heavy Plant Division, to drive Drysdale main circulating water pumps for Drakelow "C" power station. These pumps, together, are capable of delivering 40,000,000 gall/hr of water to the condensing cooling system. AEI have already been awarded the order for the 375 MW turbo-alternator for the station.

WANDLESIDE Cable Works Ltd. have been successful in securing an order from India worth £100,000.

YUGOSLAV authorities have just placed a further order for airport lighting equipment with the General Electric Co. Ltd. Total value of the contracts is now over £100,000. The new contract is for a complete airfield lighting installation.

NEWMAN Industries Ltd. have just completed a Canadian order for 1,600 electric motors ranging in size from 1 h.p. to 75 h.p., made to Canadian Standards Specification and delivered in three weeks. The company has also received an order from the West Pakistan Water and Power Development Authority for 198 vertical hollow shaft motors ranging from 15 h.p. to 50 h.p. for irrigation and land reclamation schemes.

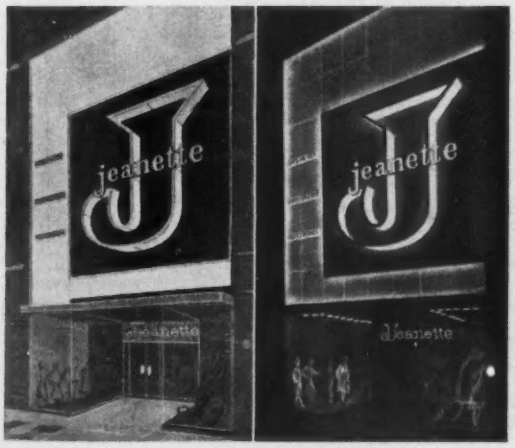
A £1,700,000 contract for secret electronic equipment for Sweden's air defence system has been placed with Marconi's Wireless Telegraph Co. Ltd.

B.E.A.M.A. constitution changes

CHANGES in the constitution of BEAMA are to be considered at a meeting called for 16 March. The plan is to combine the offices of president and chairman under the title of president, who will preside at council meetings, annual general meetings and other important functions. This change will enhance the status of the senior office bearer of the Association and ensure that he is from the electrical industry, a situation more logical than the present arrangement, the Council considers. The office of chairman will therefore lapse. It is proposed that the new office of deputy president be created, the holder being normally regarded as next in succession to the president.

It is also desired to secure the continuing help and guidance of senior members of the industry who have held the office of president or chairman and who for one reason or another might not feel able to continue to be their firm's representative on the Council. It is therefore proposed to create a new office of Counsellor, with the Council having power to invite to that office former presidents or chairmen who are either directors or full-time executives of member firms. These counsellors will hold office for a year and be eligible for reappointment. They will be entitled to attend Council meetings, but not to vote.

As a result of these changes, the existing vice-presidents will not be re-elected and the office will be abolished.



Sign Competition Winners

£150 prize-winning entry by Mr G. Nash, of West Wickham, in the Illuminated Sign Design competition organised by the Electrical Sign Manufacturers' Association. The sketch shows the day and night time effects. Second prize (£75) went to Mr T. R. Crabtree, of Prescot, and third prize (£40) to Mr H. Kirotar, of London. There were five £10 consolation prizes

Mr S. F. Steward, director of BEAMA, is seen with HM Economic Minister in Bonn, and the Oberburgermeister of Cologne, at the 3,000 sq ft collective display of British electrical domestic appliances at the Cologne International Household Goods Fair. Among items which have attracted much attention are Berry's imitation coal fires, and Tricity Cookers' "Diner-Cold" refrigerator

Britain's Trade with W. Germany

WESTERN Germany was Britain's best single customer for small washing machines and was among the ten best customers for electrical products of all kinds. At the same time, Western Germany supplied about one-fifth of the electrical goods imported into Britain. The importance of this interchange of trade was emphasised by Mr Stanley F. Steward, director of BEAMA, at a reception on the collective British stand at the International Household Goods and Hardware Fair at Cologne, last Thursday.

In recent years domestic electrical appliances had formed one of the fastest growing sectors of the industry in Britain, where nearly 800,000 people were employed in all branches of the electrical industry. Output of domestic electrical appliances had been doubled in five years and exports of these goods from the UK had increased by 27% in the past year to nearly £33 million and now represented about 11% of the total exports of British electrical products, he went on.

There had been important advances in design to meet present-day needs—notably towards complete automatic control. The development of international standards was also regarded as an important priority in promoting trade. In addition, there was a growing spirit of co-operation between electrical manufacturers throughout Western Europe over a wide range of technical and commercial matters. The electrical and mechanical engineering industries of the 13 countries of Western Europe had been brought together and worked closely through ORGALIME (Organisme de Liaison des Industries Métalliques Européenes) in which there were now no barriers between the "six" and the "seven." This type of co-operation could alleviate the effects of the tariff changes resulting from the Common Market, he stressed.

G.E.C. Offer for Sobell

THE General Electric Co. Ltd. have made an offer for all the capital of Radio and Allied Holdings Ltd., the "Sobell" and "McMichael" radio and TV firm, it was announced on Tuesday. The offer involves cash payment and a share exchange and is recommended for acceptance by the R. and A. Holdings' board. If it is accepted unconditionally, Mr M. Sobell, chairman, and Mr A. Weinstock, managing director of R. and A. Holdings, will join the GEC board.

WARM FEET FOR RACEGOERS

THERE should be no cold feet in the new stand and dining rooms in Tattersalls' enclosure at Cheltenham racecourse during this year's National Hunt meeting —electric floor-warming has been installed. All the enclosed accommodation in the stand is provided with underfloor warming by the Panelec Heating Division of British Insulated Callender's Cables Ltd. A similar installation is provided in the new 200 ft long single-storey administration block. Total loading is 210 kW.

Wylfa costs

GENERATING cost at Wylfa nuclear power station is not expected to be above the 0·5d to 0·6d/unit range that will apply to conventional generation at the time the station comes into operation, said Mr Wood, Minister of Power, answering a Parliamentary question last week. However, he somewhat confusedly qualified this answer in reply to a supplementary question by saying that it did not mean that Wylfa would mark the break-even point between conventional and nuclear power generation, because of the higher capital cost of the nuclear stations.

Guernsey's good year

WITH a further 630 consumers connected, bringing that total to 15,435, the States of Guernsey Electricity Board sold 37·5 million units in the year ended 31 Dec. last, an increase of 17%. And with tariff reductions in operation, the net surplus for the year was £35,200, compared with £40,355 in the previous year. Of the total units sold 19·5 million went to domestic consumers, 13·2 million to industrial and commercial users and 4·2 million to growing properties. The latter figure, incidentally, represents an increase of 29·2%, indicative of the increasing adoption of electrical methods by the tomato growers, horticulturists, etc. The Board's turnover in respect of domestic appliance sales and electrical installation work was also a record and in view of the rapid growth in demand (it topped 12,200 kW in December), extensions to the generating station to hold four more 2,200 kW diesel alternator sets are planned. An order has already been placed for two sets.

Official Policy on Overseas Fairs

GOVERNMENT policy on overseas trade fairs was discussed by Mr F. J. Errol, Minister of State, BoT, in the House of Commons last week. He emphasised the need for firms to follow up participation in exhibitions with a steady and consistent sales promotion campaign.

The most valuable type of overseas trade fair to British exporters was the specialised trade fair, which Mr Errol said was taking place in increasing numbers in Western Europe and other highly industrialised countries. However, there was a tendency for trade fairs, particularly in newly developing countries, to have the selling aspect overshadowed by a sort of competition in international prestige. This could be very expensive with little to show for it afterwards.

The Government was planning to assume larger financial responsibility for national pavilions at this second type of trade fair.

At specialised trade fairs and others with good selling prospects, the usual BoT method of proceeding was to obtain space and relet it to firms in each industry willing to participate. In this way an effective British display could be obtained at a predictable financial commitment. The BoT provided additional services in kind in such cases.

When overseas fairs were organised on the basis of national pavilions the Government were willing to put up a pavilion and let off the space at reduced rates to individual British firms wanting to participate.

All-British fairs overseas, such as that in New York and the one planned for Moscow, could have a great impact on the market. However, there was a strict limit to the number of such fairs which industry could man and pay for. Broadly speaking, it was only justifiable to hold one such fair a year in markets where it was thought worth while making a special effort.

Other techniques for boosting overseas selling discussed by Mr Errol were "British Weeks" and permanent exhibitions. Whereas BoT spending on overseas exhibitions totalled £68,000 in 1956-57 and in the current year would be £333,000, the plan for spending next year was no less than £530,000.

Dictating Machines Duty Case

DICTATING machines imported by Grundig (Gt. Britain) Ltd., which have been the subject of a High Court action, are suitable for the recording or reproduction of music. This judgment was given by Mr Justice Barry this week, and implies that the machines are liable for 20% import duty, rather than the 10% applying to merely dictating machines. In the judgment, "suitable" was accepted as meaning that the musical performance of the machine enhanced its selling potential. Both the company's TK and "Cub" machines came within this definition. However, the wording of the appropriate import regulations was different before 1959, and for that period, a lower rate of duty would apply.

Undergrounding for Amenity

ELECTRICITY boards have to try to preserve a reasonable balance between producing an economical supply of electricity, and safeguarding amenities. The Minister of Power said in the House of Commons this week that after consultation with the Electricity Council, he was satisfied that the boards try to preserve that balance. It would be impossible for him to frame a general direction requiring the boards to "take steps to supply by appropriate means" all farms and villages in National Parks and on National Trust land. The Minister was answering a question alleging that the boards were refusing to connect where o.h. lines were not allowed.

Tales of the Sea

REMINISCENCES by Captain C. B. Lister of experiences in tramp steamers at the turn of the century conveyed a romantic impression to Batti Wallah's last week despite his protestations that, at the time, they were anything but romantic. At the next luncheon, on 30 March, Sir William McFadzean will discuss the European situation.

Sayings OF THE WEEK

"The domestic refrigerator is now so well established as part of the way of modern living that we can cope with bad summers. When Governments behave badly, that is a much more serious matter." . . . MR E. G. ROWLEDGE, chairman of DoRDec at the Top Twelve Show.

"My own thinking takes me as far as seeing a super-institution, membership of which should be confined to all corporate engineers." . . . IEE president, SIR HAMISH MACLAREN, at the Institution annual dinner.

"The initial attempt, a decade ago, to make big machines like ZETA, etc., which might take us in one step to a power producing reactor, has failed. It was a worth-while exercise—the analogous gamble on the first fission reactor succeeded." . . . PROF P. M. S. BLACKETT, speaking on thermonuclear power.

PRICES of cable metals and other materials

Figures quoted are the official prices ruling on Tuesday, February 28

	£ per ton	Weekly change £
COPPER, standard class A (settlement) ...	227½	+¾
„ (3 months)	227½	+¾
LEAD, refined pig, 99·97% purity (cash)	64¼	−2¾
„ (3 months)	65¼	−2¾
TIN, refined, min. 99·75% purity (settlement)	801	+3½
(3 months)	802½	+2½
ALUMINIUM, ingots 99·99·5% ...	186	—
„ wire bars (4×4×54")	193½	—
BRASS Strip 63/37	201½	+2½
SILVER (Troy oz)	79⅛d	—
ZINC, virgin, min. 98% purity (cash)	84½	−½
„ (3 months)	83	−¾
RUBBER, per lb.		
No. 1, RSS, spot	25d	+1/16d
c.i.f. basis, ports, May ...	24 1/16d	+1/16d
ARMOURING:		
Galv. Steel Wire (0·104 in.) ...	66½	—
Mild Steel Tape (0·04 in.) ...	53*	—
NICKEL (home)	600	—
MERCURY (76 lb flask)	69	—
AMERICAN PRICES:		
Copper, electrolytic (per lb) ...	29c	—
Lead, (New York)	11c	—

* *Tape Price, now an average, includes varnishing*

Consulting Engineers in Competition

ENGINEERING is amongst the most exciting professions in the world, that is the opinion of Viscount Hailsham, Lord President of the Council and Minister of Science, who was guest of honour at the annual dinner of the Association of Consulting Engineers. The ACE, he said, was playing a "most relevant part in the discovery for our country of a future worthy of its past, but none the less consonant with the realities of the present and the needs of the future."

He went on to refer to the pride of belonging to a profession, but with a warning that all professional people faced a strong necessity to re-think the essentials of professional life. It was necessary that the old integrity and the old independence of judgment should not be sacrificed either to security or to higher income. However, many of the old rules and the old prejudices hamper rather than help the status of the profession today.

In the chair at the dinner was Mr Charles Blackburn (Merz and McLellan). In the course of his speech he suggested that it should be made more apparent to the foreigner how great was the national scientific research effort backing up the British consulting engineer. He felt that consulting engineers, because of their knowledge of circumstances abroad, could indicate to British research establishments lines of research valuable to British industry in the export market.

Mr Blackburn was somewhat doubtful whether the immediate future was promising for consulting engineers. This was because of difficulties being experienced in competing with Continental rivals in overseas territories.

This competition sprang from the fact that Continental concerns were offering consulting services of a lower standard—but to be able to face them it would be helpful for British consultants to have more employment in the home field. He commented that there was a great deal of expenditure in the home field by public boards and by industrial organisations, where consulting engineers could occupy a more prominent position than at present. "With the increasing size of projects, the policy of do-it-yourself was not one to be advocated."

Mr A. Paton proposed "The Guests" and Lord Hurcomb replied.

Another U.K.A.E.A. Reactor

A NEW low power reactor, "versatile experimental reactor assembly" (VERA) has been brought into operation at the Aldermaston AWRE of the UKAEA It is being used in reactor physics experiments to improve nuclear data and methods of calculation relating to fast-fission reactors.

The reactor includes a core region of thin-walled steel fuel tubes surrounded by a natural uranium reflector—the whole forming a cylinder 4 ft high and 5 ft in diameter. The fuel tubes are loaded with fissile and diluent material plates 1·7 in. sq and ⅛ in. thick. By appropriate loadings the composition and size of the reactor core may be varied to examine the nuclear importance of materials over a wide range of neutron energies. The reactor is designed to separate into two parts for safe loading, the two halves being brought slowly together by remote control.

This work forms part of a programme of experimental and theoretical nuclear data studies at AWRE and is co-ordinated with fast reactor work in progress at other AEA establishments.

News in Brief

Walker Bamford Ltd., electrical and radio wholesalers, of Perry Barr, Birmingham, last month celebrated the fortieth anniversary of the firm.

300 members and friends attended the J and P annual dinner and dance.

Impressions of Eastern Russia gained during a visit as a member of the International Electrotechnical Commission were related by Dr E. H. Norgrove, of George Ellison Ltd., at a recent meeting of the Ipswich and District Electrical Association.

The Consumer Advisory Council is inviting householders to send details of cost, etc., of electrical installations for submission to the Restrictive Practices' Court.

Company Activities

NOW that the market has digested the latest warnings from the Federation of British Industries on the shrinkage of industrial orders, the favourableness of the January trade figures, noted the strength of Wall St and decided to edge itself forward rather than back; items of pure company news appear to be exerting a greater pull on the performance of share prices.

A notable example last week in a generally firmer electrical share market was provided by the half-time news from Gas Purification and Chemical Co.

Poor profits at the half-way mark—the company's year ends on 30 June—were expected but chairman Mr D. Mathieson's announcement that the half-year's profit before tax amounted to no more than £60,000 against £505,000 in the corresponding period for the previous year came as a nasty shock. Furthermore, no interim on the 5s Ordinary shares is to be paid this time against 15% in March, 1960. Dealers immediately, the morning following the night before's revelations, slashed the shares from 16s to 10s 1½d before they recovered to close the week at 13s 1½d. Those who bought last year at the top price of 34s a share will find little comfort either in Mr Mathieson's forecast for the rest of the year.

As expected, Electric and Musical Industries pegged their interim at 5% so that the shares remained unchanged at 46s on the announcement. This, however, masks a rise from 43s 3d earlier in the week not only on anticipatory but also on American buying. They finished the week at 46s 3d.

After the better than expected profits from Hoover and their maintained dividend of 45% the "A" shares, which were marked up 1s 3d to 43s 6d after the announcement, advanced further to 48s 7½d. They now compare with a 1960-61 "high" of 54s 6d and a "low" of 38s. Hoover's Ordinary, 2s 9d dearer on the week at 49s 9d, now compare with a "high" of 56s and a "low" of 39s. Investors are clearly now taking a slightly more cheerful view about washing machine prospects. Some of Hoover's recent strength must also derive from the knowledge that three new products are about so come on to the market.

Ether Langham and Thompson also more than justified the recent strength of their 5s Ordinary shares with before tax profits up from £101,181 to £278,337, a total dividend of 20% against 15% and, for full measure, a three for five free scrip issue. Up shot the shares 3s 9d to 29s 9d and then again to 31s 6d putting them on a 3·2% dividend yield basis compared with 3·4% on the old figures.

Elsewhere, the majority of leading electrical names were finding increasing favour so that Thorn Electrical moved up from 50s 3d to 52s 9d, Dimplex were 1s 7½d dearer at 64s 9d, Colvern spurted a further 3s 6d to 47s, Chloride "A" were wanted at 85s, a 2s 6d gain over the week while even AEI managed a 1s 9d rise to 42s 3d although English Electric slipped back 3d to 33s 9d.

If economic catastrophe is round the corner then the electrical share market certainly thinks otherwise.—*From our City Correspondent.*

Clarke, Chapman and Co.

This boiler-making concern reports a profit of £323,742 for 1960, against £353,061 for the previous year, and the dividend is again 13¾%.

Clifford and Snell

Dealings are expected to start today in the new 1s Ordinary shares. France-British and General Trust are placing 1,013,584 shares at 1s 6d each. For 1960 the directors anticipate profits of not less than £57,000, before tax, and forecast a final dividend of 4%. Present trading and orders on hand indicate that 1961 profits should be higher, with the likelihood of an interim of 4% and a final of 8%.

English Electric Co. Ltd.

Output in 1960 was practically identical with that for 1959. Orders booked last year were substantially higher than ever before and as a result there are good prospects for an increased output in 1961, Lord Nelson of Stafford, chairman, tells shareholders. After referring to rationalisation of research and development to avoid wasteful duplication in the use of scientific and technical personnel, he also stresses that in the long term, the country's economy will depend on the expansion of overseas trade in capital goods. The company is well equipped to provide these goods if its offers to the customer are associated with competitive credit facilities, he adds.

Ether Langham Thompson Ltd.

After a taxation charge of £119,416 (*£46,054*), the net profit for the year to 30 Sept. last is £152,877 (*£50,502*). A final dividend of 12½% makes the total distribution 20%, against 15% last time and the forecast of 17½% at the time of the one-for-two rights issue. The profit for the year consists of £125,356 in respect of J. Langham Thompson group and its subsidiaries from the date of acquisition, 31 Oct., 1959, and £152,981 for Ether Langham Thompson Ltd. and the other subsidiaries, Electro Methods Ltd. and Ether Ltd. An extraordinary general meeting will follow the annual general meeting on 27 March to authorise the three-for-five share issue and increase the authorised capital from £700,000 to £1 million.

Gas Purification and Chemical Co.

Difficult trading circumstances met by Grundig (Gt. Britain) in the first four months and the effects of the radio and TV industry recession on AB Metal Products Ltd. and Wolsey Electronics are given as the main reason for a £445,000 decline in profits for the six months ended 31 Dec. last. Profit, before tax, for that period dropped to about £60,000 and there is no interim dividend. Since the end of November, Grundig have been earning good profits. With indications that AB Metal Products may shortly be returning to a full working week and with other companies in the group earning increasing profits, the board anticipates group profits of not less than £230,000 for the second half of the year. In that event the board will be able to recommend a final dividend.

International Combustion (Holdings)

Value of orders received in the year ended 30 Sept. last showed a reduction, but future prospects on the power generation plant side are brighter than they were a year ago, Sir James Reid Young, the chairman, reports. He emphasises that considerable fluctuations are to be expected in the order book level from year to year now that the general policy of the CEGB is to reduce the number of contractors participating in the construction of any one power station by the placing of larger individual orders. The company has been able to withstand the changing conditions, but at the expense of reduced profits. Group output fell last year by about 13%, but turnover still remained high compared with the capital employed in the business, he adds.

Mather and Platt Ltd.

Consolidated trading profit for 1960 is £1,316,774 (*£1,522,972*) and after a taxation charge of £622,040 (*£670,544*) the net profit becomes £691,876 (*£850,751*). Final dividend is 8%, again making 11%.

Midland Electric Manufacturing Co. Ltd.

The group trading profit for 1960, at £493,028, compares with £495,362 for the previous year. There is a final dividend of 8%, again making the total 12%. After taxation, etc., the net profit is £266,299 (*£264,645*).

Venner Ltd.

A total of 432,000 Ordinary shares of 5s each, at a price of 16s each, have been offered on a one-for-three basis.

Dividends Declared

Electric and Musical Industries. Interim 5% (*same*) but on larger capital.

Telefusion. Interim 8½% (7½%).

OVERSEAS NEWS

from our correspondents abroad

CANADA

No Price Fixing

No doubt a repercussion of the sentences imposed on US electrical companies for charges of conspiracy was a strong denial by the president of the Canadian Electrical Manufacturers' Association that price fixing exists in Canada. Addressing the Toronto Electric Club, Mr Kerr said that "competition is vicious and unbridled." Similar prices, he said, were the result only of manufacturers endeavouring to match the prices of their competitors.

Power Tax Criticised

Tax levied on Ontario hydro for electricity dispatched through the United States to another part of the province was strongly criticised by opposition members recently. Describing it as "involuntary" export of power, Mr Macaulay, the Energy Resources Minister, said that his department was negotiating for the removal of the tax, which amounted to $400,000 this year and was expected to rise to $650,000 in 1963.

Manitoba Amalgamation

Amalgamation of the Manitoba Hydro-Electric Board and the Manitoba Power Commission is anticipated shortly. At the moment the Hydro-Electric Board is responsible for generation of power and distribution is carried out solely by the Power Commission except in the region of Winnipeg. Aim of the amalgamation is to improve operating efficiency by staff co-ordination and to simplify financial practices, particularly in issuing new debenture stock.

Power Export to US

Whether power exports to the US should be permitted forms one of the more important Canadian political issues. The argument against power export, claimed to be supported by unhappy experiences in the past, is that however carefully the agreements are defined, once power exports have begun it is practically impossible at a later date to terminate them. Reports show that power exports are strongly supported by the Vancouver Board of Trade and also by sections of the British Columbia Energy Board and Government. President Bennett, of BC, indicated recently that he was in favour of power exports provided they were on a temporary basis. This view is supported by the backers of the Peace River scheme who argue that by using low cost thermal plants, the US could quickly replace any BC power withheld for domestic use.

National Electrical Week

With the National Electrical Week in full swing, Ontario Hydro launched a home design competition for the architectural profession to meet the standards of the Gold Medallion homes. Reference has been previously made in ELECTRICAL TIMES to these homes, some of their requirements being the installation of five major domestic appliances with circuits for five more available and at least five lighting fittings. Growing interest in electrical heating for homes was referred to recently when presentations were made to 16 leading electrical contractors who had completed an intensive course, dealing with all aspects of electric heating.

COLOMBIA

500 MW Hydro Station

Construction of a 500 MW hydro-electric station on the Rio Nare is under consideration, according to a report from Colombia. The station would be constructed by Empresas Publicas de Medellin at an estimated cost of 300 million pesos.

SWEDEN

Plastics Caulking for Dams

As part of a series of experiments on the use of plastics for reinforcing and caulking concrete dams, the Swedish State Power Board have clad with epoxy and glass fibre, a 160 sq ft area on the upstream side of the Suörva Dam. The dam, an old structure, had developed horizontal cracks which could not be sealed satisfactorily by grouting. Other experiments have revealed the extraordinary adhesive properties of epoxy resins and their high elasticity.

YUGOSLAVIA

Extensive Supply Plans

Approval has been given by the World Bank for a $30 million loan to construct a hydro-electric plant on the Senj River. Six participating banks, five US and one British, are offering the first section of the loan without World Bank guarantee. The Senj plant will have three 72 MW alternators and is part of an extensive plan to improve Yugoslavia's system capacity. A 790-mile 220 kV line will also be erected. Tenders will be open to international competition. Yugoslavia, with a water potential equalled only by that of Norway, has expanded electricity consumption over the past five years at the rate of 19% p.a. Projects aim at doubling the present 1,950 MW generating capacity and also adding 1,100 miles of line by 1965. The expansion plan is designed to meet an estimated demand growth of 15% p.a. over the next few years.

SUDAN

Italians Get Dam Contract

Construction of the Khashm El Girba Dam will be undertaken by the Italian company Torno, of Milan. The dam forms part of the Sudanese industrialisation scheme and is scheduled for completion in June, 1963.

Diesel Locomotive Order

A further order for ten diesel locomotives has been placed with English Electric by the Sudanese Minister of Communications. A further 15 locomotives have been ordered from Belgium and these will supplement the Sudanese Railways to give a total of 40 diesel locomotives.

GHANA

Volta Approval Sought

Formal approval for the Volta River power project was sought by the president, Mr Nkrumah, from the Ghana Parliament recently. The Government must approve the agreement between Ghana and the Valco aluminium consortium which is constructing an aluminium smelter near the site of the power station. The president said it was hoped that contracts would be awarded in April. Last week we reported that tenders for some of the civil work had been opened in Accra. The Ghana Government is hoping to complete agreements on loans shortly with World Bank, the US Development Loan Fund and the UK. Out of the estimated cost of £70·5 million, £30 million is to be raised by foreign loans and £35 million from Ghana's own resources.

INDIA

Soviet Loan for Bhakra

Seven industrial schemes to be financed with a £45 million loan by the Soviet Union to India include a 480 MW hydro-electric station at Bhakra and a thermal power plant in Gujarat. This credit is part of an overall loan of £108 million offered for the third Five-year Plan. Among the other industrial projects to be financed by the loan are a 2,000,000 ton oil refinery and plants for pumps and compressors.

Hydro Project in Chenab

Preliminary geological and geophysical surveys are being conducted on the Chenab River in Indian-held Jammu and Kashmir State. Investigations have shown that large hydro-electric power potentials are available on the river. These can be exploited, since the Indus Water Treaty places no restriction on power generation.

COMMERCIAL INFORMATION

Contracts Open at Home . . .

Dates given are the final for receipt of tenders unless otherwise stated.

3 March—Braintree and Bocking U.D.C. Electrical installation in The Institute.—Advertised 9 Feb. issue.

3 March—Cardiff C.C. Electrical services reorganisation, Welsh College of Advanced Technology.—See 16 Feb. issue.

3 March—Co. Antrim. (3) Electrical installation in High School extension, Whitehead. Details from Consulting Engineer: W. G. Holt, 74 South Parade, Belfast 7. Deposit £5 5s.

3 March—Durham R.D.C. Supply: electrical goods.—See 23 Feb. issue.

3 March—Frinton and Walton U.D.C. Supply of (List 12) lamps for year. Engineer and Surveyor, Council Hse, Frinton-on-Sea.

3 March—Kirkcudbright C.C. Electrical work in Gatehouse Secondary School alterations.—See 16 Feb. issue.

3 March—Southport C.B.C. Electrical installation in Floral Hall.—See 9 Feb. issue.

4 March—Barrhead B.C. Rewiring of 292 pre-war houses.—See 9 Feb. issue.

4 March—Inverkeithing B.C. Electrical work in tenement alterations, Alma St. Applications to Town Clerk: R. Mitchell, Burgh Chmbrs, by above date.

6 March—Beeston and Stapleford U.D.C. 100 units, Trunk Rd A52 lighting.—See 23 Feb. issue.

6 March—Caterham and Warlingham U.D.C. Supply of (1) 171 140 W sodium lanterns/lamps/gear and (2) 171 25 ft steel columns/brackets.—See 16 Feb. issue.

6 March—Co. Armagh. Electrical installation in Poultry Testing Station, Gosford Castle estate. Markethill.—See 23 Feb. issue.

6 March—Downpatrick U.D.C. Electrical installations in 34 houses.—See 23 Feb. issue.

6 March—Eyemouth B.C. Electrical work in new stage/refreshment room, etc., at Town Hall. Applications to Burgh Surveyor, Burgh Chmbrs, by above date.

6 March—Lancashire C.C. Supply: lighting and starting batteries; automobile lamp bulbs; dry batteries and bulbs.—See 23 Feb. issue.

6 March—Magherafelt. Electrical installation in proposed new voluntary secondary intermediate school.—See 16 Feb. issue.

6 March—Stourbridge B.C. Electrical work in 492 pre-war houses divided into four groups.—See 16 Feb. issue.

6 March—W. Riding C.C. Rewiring Shipley Grag Rd Junior School.—See 9 Feb. issue.

6 March—Wigan R.D.C. Maintenance of 790 Group "B" lamps. Surveyor: J. Holding, 10 Bridgeman Terr.

7 March—Belfast Hospitals. Electrical installations: (e) main kitchen, R.M.H.; (g) instrument repair shop, East Wing, R.V.H.; (i) diet kitchen/staff dining rooms, West Wing, R.V.H. Superintendent Engineer, Area Maintenance Dept., Management Committee, Broadway.

7 March—Dublin C.C. Supply and erection of five pumping units.—See 23 Feb. issue.

8 March—Burton-on-Trent C.B.C. Supply: electrical equipment.—See 23 Feb. issue.

8 March—Newport C.B.C. Columns and sodium lighting along parts of Somerton and Chepstow roads.—See 23 Feb. issue.

8 March—N. Riding C.C. Supply of lamps for year to children's and aged persons' homes. Clerk: R. A. Wotherspoon, County Hall, Northallerton.

8 March—Wandsworth B.C. Supply: 63 35 ft steel columns; 126 140 W condensers and transformers, 63 280 W lanterns and time switches.—See 23 Feb. issue.

9 March—Fylde Water Board. Supply two chlorinators, two pumps and ancillary equipment at Hodder Wks. Engineer, Sefton St, Blackpool.

9 March—Northwich R.D.C. 42 Group "A" concrete columns and 52 140 W sodium lamps/lanterns/gear.—See 16 Feb. issue.

9 March—Sunderland C.B.C. Electrical installation in Monkwearmouth Comprehensive School.——Advertised 16 Feb. issue.

10 March—Herne Bay U.D.C. Supply, erection and wiring of 13 25 ft steel columns with 400 W mercury lamps/lanterns/gear, plus resiting and dismantling work, for roundabout lighting. Public Lighting Inspector, Council Offices.

10 March—N.E. Metropolitan Hospitals. Applications for inclusion in approved list of electrical installation contractors to Secretary, Regional Hospital Board, 40 Eastbourne Terr, W.2, by above date. Applications should give details of recent work with values, three architect/engineer references and banker's reference.

10 March—Sunderland C.B.C. Electrical installations in 277 dwellings, Town End Farm estate.—Advertised 16 Feb. issue.

11 March—Caithness C.C. Electrical work in 123 houses.—See 16 Feb. issue.

11 March—Newton Abbot U.D.C. Class "A" street lighting included in roadworks contract (No. 3) and Class "B" in police station access road (No. 4). Applications to Surveyor: C. Lunn, 18 Devon Sq, by above date.

12 March—Louth R.D.C. Supply and erection of duplicate (each 100 g.p.m.) sewage ejectors complete with motors, starters and accessories for Legbourne and Little Cawthorpe scheme. Details from Consulting Engineers: John H. Haiste and Ptnrs, Belmont Hse, 20 Wood La, Headingley, Leeds 6. Deposit £2 2s, made payable to R.D.C.

13 March—Faversham B.C. 73 columns/sodium lanterns/equipment; 32 mercury fluorescent lanterns/columns/wall brackets/equipment.—See 23 March issue.

13 March—Southgate B.C. (Contract A) Supply of 690 60 W sodium lanterns/gear; (B) supply and erection of concrete columns, fixing lanterns, etc., plus wiring; (C) supply of 163 140 W sodium lanterns/gear; (D) supply and erection 163 25 ft concrete columns, fixing lanterns, etc. Borough Engineer and Surveyor, Town Hall, N.13.

13 March—Stockport B.C. Electrical installation in new ambulance depot, Heaton La.—See 16 Feb. issue.

13 March—Sunderland R.D.C. Supply: goods, fires and cable.—See 23 Feb. issue.

14 March—Llanelly R.D.C. Lighting on trunk road, A48; 12 steel columns with 140 W sodium discharge lamps; two columns 85 W lamps; 21 140 W sodium discharge lamps.—Advertised 23 Feb. issue.

14 March—Wallasey C.B.C. Supply of 570 reinforced concrete Group "B" columns and 570 open type Group "B" lanterns. Engineer and Surveyor, Town Hall.

16 March—Dun Laoghaire T.C. Provision of public lighting Marine Rd and Park Haigh Terr. Town Clerk, Town Hall.

16 March—Stevenage D.C. Provision and erection of 200 aluminium columns/lanterns and maintenance service for 1961-62 programme. Chief Engineer: G. E. Hardy, Daneshill Hse, Danestrete.—Advertised in this issue.

17 March—Grimsby C.B.C. (c) Electrical installation in comprehensive school, Ely Rd.—See 16 Feb. issue.

17 March—Magor and St. Mellons R.D.C. (1) Supply and erection of 179 columns/lanterns/gear; (2) supply and laying of cable for A48 lighting. Engineer, Council Offices, Baneswell, Newport, Mon. Deposit £3 3s.

17 March—Pewsey R.D.C. Power installations in 1 to 10 Ham Close, and 3 to 6 Knapp Close, Collingbourne Kingston and Ducis, respectively. Engineer and Surveyor, Council Offices.

17 March—Westhoughton U.D.C. Supply: lamps.—See 23 Feb. issue.

17 March—Wilton B.C. Street lighting installation, Seagrim estate and Burcombe La.—See 16 Feb. issue.

18 March—Swansea B.C. Electrical installation in central police station. Applications to Borough Architect, Guildhall, by above date. Deposit £5.

18 March—Wexford C.C. Electrical distribution scheme, County Hall. Details from Consulting Engineers: N. Matthews and Co., 42 Fitzwilliam Pl, Dublin. Deposit £3 3s.

20 March—Armagh R.D.C. (1) Two 1,500 g.p.m. at 260 ft head 3-ph. motors/pumps complete with starters and switchgear; (2) water level remote control apparatus. Clerk: J. A. Dawson, Council Offices, Tower Hill, Armagh.

20 March—Hereford C.C. Wiring (a) five bungalows, Home La; and (b) 12 bungalows, Hillside Ave. City Architect, Town Hall. Deposit £1.—Advertised in this issue.

Your Queries Answered

Readers are invited to make use of our free enquiry department which possesses wide resources, including an index of trade information with over 100,000 entries

A Selection from the 112 queries answered this week

"Mindus" electric towel rails—makers of? R.W.S.—Midland Industries Ltd., Heath Town Wks, Deans Rd, Wolverhampton, Staffs.

"Klixon" thermostats — makers of? C.M. — Salford Electrical Instruments Ltd., Magnet Hse, Kingsway, W.C.2.

Transformer incorporated in a plug as noted by "Megohm" on page 291, 23 Feb., 1961, issue—makers of? G.E.—Dohm Group, 167 Victoria St, S.W.1.

"Etelco" plugs and sockets—makers of? T.E.—Etelco Ltd., 22 Lincoln's Inn Fields, W.C.2.

"Fridor" Dutch sewing machines—agents for? S.E.B.—Fridor (G.B.) Ltd., 224 Clapham Rd, S.W.9.

"EEL" densitometers — makers of? M.O.A. — Evans Electroselenium Ltd., Potter St, Harlow, Essex.

"Beurer" blankets—makers of? I.N.—A. F. Allchin and Co. Ltd., 253 Bordesley Green, Birmingham 9.

"Proscon" thermostats — makers of? M.N.—Process Control Gear Ltd., 42 Lattimore Rd, St. Albans, Herts.

"Minex" extractor fans—address for? E.E.B.—Jones and Stevens Ltd., Easter By-pass, Littlemore, Oxford.

"Ekar" combined washing machines and spin dryers—address for? T.E.—Ekar Ltd., Tudor Hse, Station Rd, N.22.

20 March—Londonderry C.C. Supply: heavy equipment for school kitchen.—See 23 Feb. issue.

20 March—Nottingham C.C. Centrifugal well pumps, motors, switchgear, etc., for Basford.—See 2 Feb. issue.

20 March—West Riding C.C. (1) Floodlighting of play courts, Swinton Secondary School.—See 23 Feb. issue.

21 March—Armagh. Electrical installation in Convent of the Sacred Heart Grammar School extensions.—See 23 Feb. issue.

21 March—Bedfordshire C.C. (b) Electrical installation in Clapham/Oakley County Secondary School.—See 19 Jan. issue.

21 March—Manchester C.C. (b) Electrical installation in Didsbury Training College extensions. City Architect, P.O. Box 488, Town Hall.

24 March—Down C.C. Electrical heating and lighting installation, Taxation Dept., Mount Cres, Downpatrick. Details from Consulting Engineers: Barrett and Agnew, 420 Ravenhill Rd, Belfast. Deposit £2 2s.

27 March—E.B. for N. Ireland. Specification NI.1620, h.p. steam and feed pipework with valves for Coolkeeragh. Documents from Consulting Engineers: Kennedy and Donkin, 64 Royal Exchange, Manchester 2. Deposit £5 5s.

27 March—Tamworth B.C. Supply, erection and wiring: (1) 53 200 W sodium lighting units on 30 ft steel columns; (2) 14 250 W mercury lighting on 25 steel columns; (3) 20 250 W mercury on 25 ft concrete columns; (4) 22 80 W mercury on 15 ft concrete columns. Borough Engineer and Surveyor: H. F. Bruce Smith, Municipal Offices.—Advertised in this issue.

7 April—Bilston B.C. Supply and erection of 280 60 W sodium Group "B" lamps on 15 ft concrete columns. Borough Engineer, Municipal Bldgs, Hall St. Deposit £2 2s.

17 April—E.B. for N. Ireland. Specification NI.1615, one steam and one motor-driven feed pump for Coolkeeragh. Documents from Consulting Engineers: Kennedy and Donkin, 64 Royal Exchange, Manchester 2. Deposit £5 5s.

No date stated—Haddington B.C. (7) Electrical installations in erection of six houses at Church St. Town Clerk: J. McVie, Town Hall.

No date stated—Jarrow B.C. Applications for inclusion in approved list for supply (List 14) electrical materials, to Borough Engineer, Town Hall.

No date stated.—N. of Scotland H-E.B. Double-circuit steel tower and two single-circuit wood pole lines for Mybster/Thurso 132 kV and 33 kV at Thurso.—Advertised 23 Feb. issue.

No date stated—Prestonpans B.C. (8) Electrical installations in six three-apartment houses, Kirk St/Kirk Wynd.—See 23 Feb. issue.

GAZETTE ANNOUNCEMENTS

BANKRUPTCY ACTS

Receiving Orders

Bangor. L. Nadin, radio and electrical dealer, formerly carrying on business at 1 Vaughan St, Station Sq, rear of Maddoc St, Llandudno; Oakland Hse, Penmaenmawr; 59 Abergele Rd, Colwyn Bay, and Denbigh St, Llanrwst. Receiving order dated 16 Feb.

Durham. C. E. W. A. Loerns, electrical retailer, formerly carrying on business as C. and P. Lawn, at 37 Hope St, Durham. Receiving order dated 15 Feb.

Intended Dividends

Merthyr Tydfil. T. R. Thomas and E. Jones, electrical contractors, etc., carrying on business as T. R. Thomas and Co., at "Golden Key," Union St, Dowlais. Last day for receiving proofs for intended dividend: 7 March, to trustee: G. H. Down, 106 Walter Rd, Swansea.

Pontypridd, Ystradyfodwg. A. Roberts, electrical and hardware dealer, formerly carrying on business as Roberts Radio and Television Services at 18 Penygraig Rd, Penygraig, and Hill View Stores, Tonyrefail. Last day for receiving proofs for intended dividend: 7 March, to trustee: G. H. Down, 106 Walter Rd, Swansea.

Southampton. C. H. Clegg, radio, television and electrical dealer, formerly carrying on business as Collens Electrical Services and lately as Colins Electrical Services at 178a Burgess Rd, Southampton, and at Bulford Market Sq, Bulford. Last day for receiving proofs for intended dividend: 11 March, to trustee: N. W. Osborne, Bank Chambers, 1 John St, Bedford Row, W.C.1.

COMPANIES ACTS

Ventura (Lighting) Ltd. Creditors to send details to liquidator: F. E. Antill, 116 Grosvenor Pl, W.1, by 12 March. Formal notice: all creditors to be paid in full.

Shardlows (Clowne) Ltd. Creditors to send details to liquidator: G. Godley, 4a Queen St, Worksop, by 10 March.

Latgol Ltd. Petition for winding-up to be heard before the High Court of Justice, Strand, W.C.2, on 6 March. Persons intending to appear to notify Cochrane and Cripwell, 119 Finsbury Pavement, E.C.2, by 1 p.m., 4 March.

Reco Electronics Ltd. Petition for winding-up to be heard before the High Court of Justice, Strand, W.C.2, on 6 March. Persons intending to appear to notify Macdonald, Stacey, Meredith Hardy and Hutchison, 7-8 King's Bench Walk, E.C.4, by 1 p.m., 4 March.

J. M. Glauser and Sons Ltd. Mr. A. K. Williams, Argyle Hse, 29-31 Euston Rd, N.W.1, appointed liquidator at extraordinary general meeting on 11 Feb. for the purpose of voluntarily winding-up.

M. J. Fairman Ltd. Mr. T. S. Mullarkey, 27 High St, Rainham, Kent, appointed liquidator at extraordinary general meeting on 14 Feb. for the purpose of voluntarily winding-up.

Verdik Sales Ltd. Mr. B. Phillips, 76 New Cavendish St, W.1, appointed liquidator at extraordinary general meeting on 7 Feb. for the purpose of voluntarily winding-up.

Wm. Gregory (Electrical Installations) Ltd. Mr. F. A. Ricks, Sherwood Bldgs, Sherwood St, Nottingham, appointed liquidator at extraordinary general meeting on 9 Feb. for the purpose of voluntarily winding-up.

D. E. Cooper and Son Ltd. First meetings of creditors and contributories to be held at Room 401, Inveresk Hse, 346 Strand, W.C.2, on 2 March at 3.30 and 4 p.m., respectively.

Maypole Electrical Ltd. First meetings of creditors and contributories to be held at Room 401, Inveresk Hse, 346 Strand, W.C.2, on 3 March at 2.30 and 3 p.m., respectively.

Bracrealm Electrical Ltd. First meetings of creditors and contributories to be held at Official Receiver's Office, 20 Byrom St, Manchester 3, on 8 March, at 11 and 11.30 a.m., respectively.

. . . and Overseas

*Details of items marked * may be obtained on application to the Board of Trade, Lacon Hse, Theobalds Rd, W.C.1, quoting reference.*

8 March—Rhodesia and Nyasaland. 3,520 yd 11 kV cable; 2,000 yd a.c.s.r. conductor; preformed aluminium conductor armour rods. Town Clerk, P.O. Box 591, Bulawayo. B.o.T. (ESB/5240/61).*

10 March—Thailand. Meters kWh (ten items). Provincial Electricity Organisation, Sam Sen. B.o.T. (ESB/5504/61).*

12 March—Kuwait. 300 drinking water coolers. President, Dept. of Electricity, Water and Gas. B.o.T. (ESB/6452/61).*

15 March—Ghana. (a) 66,000 yd p.v.c. insulated cadmium copper wire; (b) 34½ tons bare h.d. copper wire. Documents, fee £1, from Secretary, Ghana Supply Commission, P.O. Box M.35, Accra.—Advertised in this issue.

15 March—India. Tender S-313: Two ultrasonic flaw detectors. Details from India Store Dept. (CDN Branch), Government Bldg, Bromyard Ave, W.3. Fee 3s 7d.

15 March—India. 500 yd p.i.l.c.s.w.a. 3-core 660 V cable and 1,000 ft similar cable for 11 kV. Chief Purchase Officer, National Development Corpn., Darbhanga Hse, Ranchi. B.o.T. (ESB/6002/61).*

21 March—Greece. Heating equipment for railway coaches and train generator. Purchasing and Stores Dept., Hellenic State Railways (SEK), 34 Thermistocleous St, Athens. B.o.T. (ESB/4999/61).*

21 March—New Zealand. 3,000 fuse and shackle insulators for 400/300 V. Town Clerk, G.P.O. Box 2199, Wellington C.1. B.o.T. (ESB/5587/61).*

21 March—New Zealand. Seven mile 7/·064 and 14 mile 19/·064 bare copper wire. Town Clerk, Town Hall, Wellington C.1. B.o.T. (ESB/6485/61).*

22 March—New Zealand. 5,000 yd 9-core, 18,000 yd 6-core, 15,000 yd 6-core paper or plastics insulated pilot cables. Town Clerk, Town Hall, Wellington C.1. B.o.T. (ESB/6039/61).*

CONTRACTS PLACED

Bath C.C. Supply of capacitors for year, Abacus Municipal Ltd.

Eccles B.C. Electrical installation, Peel Green branch library, Simmons Electrical Contracting Co., £910. Recommended.

Hendon B.C. Edgware branch library lighting fittings, General Electric Co., £945. Recommended.

Stockport B.C. Electrical installation, Reinbek Home extension, Sunderland Forge and Eng. Co., £960.

Stoke-on-Trent C.C. Provision of mercury lighting, Ford Green Rd, Eleco, £1,760. Recommended.

Watford B.C. Electrical installations, old people's dwellings, Brightwell Rd, J. and J. Burtenshaw Partners Ltd., £1,775 Recommended.

TRADE NOTES

Changes of Address. Robert Ritchie (Electrical) Ltd. have moved to Navigation Mill, Blackburn, Lancs.

The Midlands headquarters of the Rheostatic Co. Ltd. is now at 38 Smallbrook, Birmingham, where the company also represent Black Automatic Controls Ltd. The telephone no. is Midland 8476.

Within the next six weeks the whole of the administrative staff of the Midland Metal Spinning Co. Ltd. and National Pressure Cooker Co. (England) Ltd. will transfer to new offices at Wombourn. Telephone Wombourn 2411.

Acquisition. Alliance Electric Wks Ltd. of Montreal, has been purchased by the Munck International A/S, but the company is to continue to operate as before.

Change of Name. The title of the Mond Nickel Co. Ltd. has been changed to International Nickel Co. (Mond) Ltd.

Manufacturing Rights. The European and Commonwealth manufacturing rights of the range of Pegasus electro-hydraulic servo valves and associated electronic equipment have been acquired by Telehoist Ltd., of Cheltenham, from Pegasus Laboratories Inc., Detroit.

E.W.F. Hobday Bros., of Gt. Eastern St, E.C.2, has ceased to be a member of the Electrical Wholesalers Federation.

BUSINESS PROSPECTS

Axminster. Axminster Carpets Ltd. plan factory extensions.

Basildon. D.C. plan new factory for Wass, Pritchard and Co. Ltd., printers, etc., 85 Fenchurch St, E.C.3.

Bingley U.D.C. Tender: 36 flats, Main St. Surveyor.

Blackburn. Old people's home at Burnley Rd, to cost £49,220.

Blackpool. Cinema/bowling centre at Hippodrome Theatre, planned by Associated British Cinemas Ltd., 30 Golden Sq, W.1.

Boldon. Matkin and Hawkins, Barclays Bank Chambers, Fawcett St, Sunderland. architects for Tyne and Wear Electrical Co., Moor La factory additions.

Brighouse. Proposed industrial buildings and offices, Wakefield Rd, for J. Blakeborough and Sons Ltd., Woodhouse Wks.

Burton-on-Trent. T.C. to erect residential home at Hawfield La.

Chesterfield T.C. Tender: First part of development 750 houses, Loundsley Grn Estate. Surveyor.

Cookham. Storage and welfare buildings, Temple Mills, Bisham, proposed Robert Hough (Marlow) Ltd.

Croydon. J. Phillips, 1 Old Burlington St, W.1, architect for P. Boyden and Co. Ltd., 5 Commerce Way, factory and offices. —Sir Robert Tasker and Ptnrs, 3 Field Ct, Grays Inn, W.C.1, architects for showrooms/offices (£150,000) proposed by Commercial and Industrial Structures Ltd., 77 George St, W.1.

Derbyshire C.C. Final stage of Chesterfield College. County architect, Matlock.

Dorset. W.O. starts two-phase rebuilding of Blandford Camp as Army School of Signals H.Q. (£1,750,000).

Durham. Planned: £3 million extension scheme for Durham College.

Eastbourne. B.C. to plan training centre for 60 children, at Shinewater La.

E. Suffolk C.C. Tender: Holbrook Modern School extensions, etc. County Architect, Ipswich.

Edinburgh. Dean of Guild Court has approved: Extensions, etc., at Northern General Hospital, Ferry Rd, £29,000; alterations, etc., at Royal Edinburgh Hospital for Mental Disorders, £40,000.

Egham U.D.C. Tender: 36 dwellings, Rowan Ave. Engineer.

Fawley. £4 million butyl rubber plant for Esso Petroleum Co., by Foster Wheeler Ltd., Chapel St, N.W.1.

Glasgow. Taylor Woodrow Construction Ltd. to erect £109,000 Milnbank six-storey flatted factory.—Alex Stephen and Sons Ltd. plan engine wks extensions, Linthouse Bldg, Govan Rd.—Three-storey department store/showrooms planned at 582-588 London Rd, S.E., for James Grant and Co. (West) Ltd.—Miller and Black, 5 Newton Pl, C.3, architects for block of offices, 112 West Regent St, and 130 Wellington St, C.2, for Campbell Henderson (Holdings) Ltd., 220 Broomielaw, C.1.—Humphrey and Lipski, 13-14 Cork St, W.1, architects for block of offices/shops at 39-47 Cambridge St, Renfrew St, and Rose St, C.2, for Commercial and General Investments (Scotland) Ltd., 19-20 Grosvenor St, W.1.; also shops/offices, 110-114 Bath St, C.2, for Namsorg Trust Ltd., 18 St. Swithins La, E.C.4.

Gloucestershire C.C. To acquire 1¼-acre site for industrial centre for the mentally handicapped at Arle Rd, Cheltenham.

Grimsby. Revertex, Harlow New Town, plan new factory on Humber Bank, Stallingborough.

Harlow. W. and C. French Ltd., Buckhurst Hill, Essex, to erect factory for Faber and Faber Ltd., 24 Russell Sq, W.C.1.

Harold Hill. J. C. Maxwell-Cook, 12 Bristol Gate, Brighton 7, is architect for Jarman and Platt Ltd. extensions.

Hillsborough R.D.C. Wm. Barklie Maxwell, architect for 16 houses, Dromara; 14 houses, Ravarnet. Architect, 5 University Terr, Belfast.

Hinckley. New head offices, Sketchley cleaners.

Hull. Aged persons' home at Clough and Beverley Rds, planned.

Ilford. Showrooms/offices at 393-401 High Rd, planned by Donald Harwin and Ptnrs, 776 High Rd, N.12

Kesteven C.C. Junior Training Centre, Grantham. County architect, Sleaford.

Kettering. Mitchell Construction Ltd., contractors for new £634,420 hospital.

Kidderminster B.C. Tender: 30 dwellings, Habberley. Engineer.

Kingston-on-Thames. Courage and Barclay Ltd., S.E.1, propose showrooms and offices, warehouses, licensed premises and a hotel on brewery site.

Leeds T.C. Aged persons' hostels plans include: Erection of a hostel at Kirkstall; adaptations to "Greystones," hostel; extensions to Gledhow Manor hostel.

Liverpool. £750,000 rubber reclaiming plant for new company promoted by Dunlop Rubber Co., Ryder St, S.W.1.—T.C. plan aged persons' hostel at Acrefield Rd, Woolton.

London Airport. F. S. Snow and Ptnrs, 144 Southwark St, S.E.1, are consulting engineers for B.O.A.C. £1¼ million hangers.

London. L. Obermeister, 13 Spencer Ct, Parkley, Ham, Surrey, is architect for three-storey industrial premises, 5-8 Roberts Pl, E.C.1.—J. Batty and Son, 142 Minories, E.C.3, architects for offices, etc., 38-39 Houndsditch, E.C.3.—C. Living and Sons, 2 Romford Rd, E.15, are architects for Barking Rd, E.16, factory extensions for C. E. McConnell Ltd.—J. K. Greed, 14 Hill St, Richmond, is architect for Pennington St, E.1, factory.—H. Fitzroy Robinson and Ptnrs, 3 Gray's Inn Sq, W.C.1, are architects for Brewery Rd, N.7 factory for Woburn Studios.—A. Vernon and Ptnrs, 5 Buckingham Pl, S.W.1, plan Broomhill Rd extensions for Redifon Ltd.—D. E. Harrison, 61 Frognal, N.W.3, architect for six-storey and basement office planned at Brixton Hill and Porden Rd, S.W.2.—Ardin and Brookes and Ptnrs, 129 Mount St, W.1, architects for six-floor building, 5-7 John Princes St, W.1. —Sir Lancelot Keay, Basil G. Duckett and Ptnrs, 2 Oldbury Pl, W.1, architects for seven-storey block of flats at Lowndes St and West Halkin St, S.W.1, proposed by Capital and Counties Property Co. Ltd.—Shopping development (£250,000) proposed at The Broadway, W.13, for Shop Hldgs and General Property Co. Ltd., 13 Harley St, W.1.—George Trollope and Sons, 13 Hobart Pl, S.W.1, architects for five-storey building at 4 Greek St, W.1.—R. Seifert and Ptnrs, Red Lion Sq, W.C.1, architects for five-storey offices at 93-101 Blackfriars Rd, S.E.1.—Knapton and Deane, 6 Martin La, E.C.4, architects for five-storey offices at 8-11 St. George's Circus, S.E.1, and Blackfriars Rd, Borough Rd, etc., for Sunley Investment Trust, 25 Berkeley Sq, W.1.—P. V. Burnett and Ptnrs, 12 Bloomsbury Sq, W.C.1, plans for 13-storey hotel/showrooms/shops Normandie Hotel, Knightsbridge, S.W. site.—C.C. to adapt 76 Putney Hill, S.W., as a hostel for mental health patients, £35,000.

Malling R.D.C. Tender: 18 three-storey flats, West Malling. Engineer, West Malling.

Manchester. Hospital Board, Cheetwood Rd, plan £500,000 Royal Infirmary, Blackburn, extensions.—New boiler house at Queen's Park Hospital proposed.—Ladywell Hospital, £49.829 conversions planned.

Margate. Westwood Ind. Site: Factory extensions for Algraphy Ltd. and factory for J. F. Smith.

Middlesbrough. Wimpey and Co. Ltd., Orchard Hse, Fenwick Terr, Newcastle, plan further 72 houses, Kader Ave.—Wilburn and Son, South Parade, Doncaster, architects for S. Smith's Old Brewery, (Tadcaster) Ltd., Broughton Ave Hotel.—Reynolds and Scott, 9 Albert Sq, Manchester 2, architects for St. Mary's Convent. —S. J. Hill and Ptnrs, 2 Whitfield St, Gloucester, architects for Palladium and Regent Cinemas conversions for Ceres Investments.

Moray C.C. Tender: 50 houses, Lhanbryde. County Architect, Elgin.

Morley T.C. Tender: 34 traditional houses. Engineer.

Newcastle-on Tyne. Development of 27-acre site, Castle Ward area, proposed by J. T. Bell and Sons, Market St, Newcastle-on-Tyne, for residential purposes.

North Riding C.C. Tender: Malton Co. Junior School. County Architect, Northallerton.

North Walsham. Wall Eng. Co. Ltd., Aylsham Rd, plan industrial development, Cromer Rd area.

Notts. C.C. Home for more infirm at Sutton-in-Ashfield (50 beds), cost £83,000; and similar at Mansfield Woodhouse, £83,000 approved by Welfare Comm.—Youth wings are planned at Ollerton Adult Residential Training Centre, also at Kirkby-in-Ashfield, Allerton, Hucknall and Newark schools. Cost £75,000.

Peterborough C.C. Tender: 60 dwellings, Crown St estate extension. City Engineer.

Plymouth. A. F. French and Ptnrs, Pearl Assurance Hse, Royal Parade, are architects for Fine Tubes Ltd., Estover factory.

Portsmouth. Colt Ventilation Ltd., Surbiton, plan use of eight acres at West Leigh. —Factory / offices planned, Western Rd, Wymering, and alterations to form two factories, 5-19 Durham St, for Rigbys of Portsmouth Ltd., 7-9 Durham St.—Factory/offices planned, Fitzherbert Rd, Farlington, for Land and Commercial Hldgs. Ltd.—Factory extensions for Wm. Fletcher Jnr. Ltd., Regent St, Landport, workshop extensions for Vosper Ltd., Hamilton Rd, Paulsgrove. —Two- and three-storey building for shops/bowling centre/dance hall, planned by Plutarch Securities Ltd.

Port Talbot. £10 million petro-chemical plant planned for British Hydrocarbon Chemicals Ltd., Devonshire Hse, Mayfair Pl, W.1.

Radnorshire C.C. Tender. Newbridge-on-Wye Primary School. County Architect, Llandrindod Wells.

Rotherham C.B.C. Tender: 202 houses, Kimberwood Pk estate. Engineer.

Salisbury. Dunns Farm Seeds Ltd., Scammells Rd, plan drying/grain processing plant at Stonehenge Rd, Durrington.

Southampton. Ove Arup and ptnrs, 13 Fitzroy St, W.1, and G. H. Buckle and Ptnrs, 2 Harrington Gdns, S.W.7, are consulting engineers for £120,000 Nuffield Theatre, Southampton University.

Sunderland. Planned: 450-pupil, Redcar Rd, Southwick R.C. Secondary School. Architect D. Brown, Lambton Rd, Jesmond. Newcastle.

Uxbridge. Factory/offices proposed for Mogron Ltd., Norwich Union Hse, Bakers Rd, Uxbridge, to plans by A. E. Silver, Park Ave, Wraysbury.

Warwick B.C. Tender: 45 houses, West End area. Engineer.

Watford. Factory at Stanborough Park, Garston, planned for Granose Foods Ltd.—Factory extensions, Sandown Rd, for Litholite Insulators and St. Albans Mouldings Ltd.—Factory extensions for process work, Whippendell Rd, for Sun Printers Ltd.—Factory at Bushey Mill La, for R. and J. Beck Ltd.—Factory, Bushey Mill La, for Furzehill Laboratories Ltd., 57 Clarendon Rd, Watford.—Redevelopment, Apem Wks site, St. Albans Rd, for Argyle Industrial Properties Ltd.—Storage / distribution building, Colonial Way, Station Estate, for T. Wall and Sons Ltd., Acton, W.3.—Factory and offices, 108-124 St. Albans Rd, for Hoare, Sykes and Co., 42 Old Broad St, E.C.2.

West Riding C.C. Tender: Old people's home, Thorne, County architect, Wakefield. —Propose aged persons' hostel at Field La, Rastrick.

Whitworth U.D.C. Tender: 36 dwellings, Moss Side St. Engineer.

NEW COMPANIES

Extracted from the Register issued by Jordan and Sons Ltd., 116 Chancery La, W.C.2.

Alonarm Ltd. Electrical, radio, television, mechanical and general engineers, etc. Nom. cap.: £100. Dirs.: not named. Subs.: Laurance R. Battell, 117 Hart Rd, Thundersley, Essex, Wm. J. Wilman.

R. K. Bryant Ltd., 79 Mile Oak Rd, Southwick, Sussex. Electrical engineers and contractors, etc. Nom. cap.: £500. Dirs.: Ronald K. Bryant and Mary A. L. E. Bryant.

Cathard Ltd., 57a High Rd, Ilford, Essex. Lampshade manufacturers and dealers, etc. Nom. cap.: £100. Dir.: Catherine F. Carroll.

Danelean Ltd., 6 Surrey St, W.C.2. To carry on business of vacuum cleaner manufacturers, etc. Nom. cap.: £100. Dirs.: to be appointed by subs. Subs.: Stanley H. Lucas and Francis A. Dean.

Dasym Electrics Ltd., 6 Surrey St, W.C.2. Manufacturers of and dealers in vacuum cleaners, etc. Nom. cap.: £100. Dirs.: to be appointed by subs. Subs.: Stanley H. Lucas and Francis A. Dean.

Deptford Electrics Ltd., 13 Clarendon Rise, S.E.13. To take over business of "Deptford Electrics" carried on at 389 New Cross Rd, S.E.14, and at 285 Southwark Park Rd, S.E.16, etc. Nom. cap.: £2,000. Permanent dirs.: Arthur G. Carter and Alice L. Carter.

O. Davies Ltd., 44 Kennedy St, Manchester. Manufacturers of and dealers in electrical apparatus. Nom. cap.: £2,000. Dirs.: Olive M. Davies and Cyril Davies.

Decalmat Electrics Ltd., 6 Surrey St, W.C.2. Manufacturers of and dealers in vacuum cleaners, etc. Nom. cap.: £100. Dirs.: to be appointed by subs. Subs.: Stanley H. Lucas and Francis A. Dean.

Dictating and Audio Service Ltd., Creek Hse, East Molesey. Electronic and electrical engineers, etc. Nom. cap.: £100. Dirs.: Herbert N. Jubb and Mary L. Jubb.

Dome Optical and Electrical Co. Ltd. Nom. cap.: £1,000. Dirs.: to be appointed by subs. Subs.: Reginald Harris and Percy F. Money, 3-4 Clements Inn, W.C.2.

L. R. Duncum and Company Ltd., 199 Godstone Rd, Whyteleafe, Surrey. Electrical engineers, general electrical and refrigeration contractors, etc. Nom. cap.: £100. Dirs.: Leslie R. Duncum and Mrs. Jean B. Duncum.

Electro-Mechanical Equipment Co. Ltd., 78 Old Broad St, E.C.2. Nom. cap.: £1,000. Dirs.: not named. Subs.: Robert G. Davey and Florence B. Watkins.

Floor Heating Ltd., 202-204 Bishopsgate, E.C.2. To carry on business of electrical engineers, etc. Nom. cap.: £100. Dirs.: Jacques M. Beskine and Nathalie Radstone.

Gardner Electrical Service Ltd., 80 Lander Rd, Stockwell, S.W. Nom. cap.: £1,000. Dirs.: to be appointed by subs. Subs.: John J. Gardner and Reginald A. Hemmings.

General Sales and Service (Cwmgorse) Ltd., Rock Shop, 32 Gorse St, Cwmgorse, Glam. Electricians, mechanical and electrical engineers, etc. Nom. cap.: £600. Dirs.: James W. Gilbert, Wm. E. Watson and John D. Jones.

Hall and Wolsey Ltd., 35 Exchange St, Norwich. To take over business of wholesale electrical goods factors carried on at 30 Connaught Rd, Norwich, by Edwd. John Hall, Geo. J. Hall and Jas. H. Wolsey, etc. Nom. cap.: £1,000. Dirs.: Edwd. J. Hall, Geo. J. Hall and Jas. H. Wolsey.

Instruments Electrical (Electronics) Ltd., 107 Newington Causeway, S.E.1. Manufacturers of and dealers in wireless or radio sets, etc. Nom. cap.: £100. Dirs.: Joseph A. S. Rowe and Wlodzimierz G. Mitrega.

Iron-Bond (Factors) Ltd. To carry on business of engineers, mechanical, television, electrical and motor engineers, etc. Nom. cap.: £600. Dirs.: to be appointed by subs. Subs.: Wm. D. Gibson and Mrs. Jennifer I. Gibson, 17 Brook Rd, Gidea Park, Essex.

Kelwood Electrical Ltd., 67 Lord St, Liverpool 2. Nom. cap.: £100. Dirs.: Ronald Smith and John Dunne.

Kenelec Electrical Supplies Ltd., 42 Oatlands Dr, Slough, Bucks. Nom. cap.: £1,000. Dirs.: Patrick V. Kennedy and Mrs M. C. Kennedy.

Leisurelite Ltd. Manufacturers of and dealers in clothing, furniture, electrical appliances, etc. Nom. cap.: £1,000. Dirs.: to be appointed by subs. Subs.: Dorothy M. Graeme and Paul G. Graeme, 61 Fairview Ave, Gillingham, Kent.

Renterprises Ltd., 90 Southgate, Elland, Yorks. Manufacturers of and dealers in artificial lighting apparatus, electrical plant, etc. Nom. cap.: £5,000. Dirs.: Derek Hutchinson and Jack Priestley.

Toytronics Ltd. Mechanical, electrical and general engineers, etc. Nom. cap.: £100. Dirs.: not named. Subs.: James A. Cowell, 11 Lichfield Rd, Cambridge; and Raymond Halksworth.

Anthony L. Young Ltd., 26 Craven St, W.C.2. Manufacturers of and dealers in radio, electrical and mechanical apparatus, etc. Nom. cap.: £5,000. Dirs.: Anthony L. Young, Joyce P. Young and Norman L. Mosdall.

TRADE MARKS

This information is extracted from the Official Journal by permission of the Controller.

Domocril. 809,311. Class 17. Insulating coating preparations, etc. The British Domolac Co. Ltd., 81 Harrow Manorway, Abbey Wood, S.E.2.

Emi. B809,579. Class 7. Washing, drying and ironing machines. B809,581. Class 9. Scientific instruments, vacuum cleaners, dust extractors, irons, etc. B809,583. Class 11. Refrigerators, electric apparatus for heating, cooking and drying, etc. Electric and Musical Industries Ltd., Blyth Rd, Hayes, Middx.

Ever Ready. 806,143. Class 7. Washing machines and spin driers. The Ever Ready Co. (Great Britain) Ltd., Hercules Pl, Holloway, N.7.

Faema in design. 802,272. Class 9. Vacuum cleaners, etc. Ernesto Valente, Via Ventura, 5-Milano, Italy.

Flexistrip. B796,602. Class 9. Connections in strip form for use in printed circuits. The Telegraph Condenser Co. Ltd., Wales Farm Rd, North Acton, W.3.

Thermaster. B802,242. Class 9. Instruments incorporating a temperature sensing head for measuring and indicating temperature, etc. Sifam Electrical Instrument Co. Ltd., Leigh Ct, Higher Lincombe Rd, Torquay, Devon.

Transpeed. 811,347. Class 9. Motor speed control apparatus, etc. Mather and Platt Ltd., Park Wks, Manchester 10.

Transtar. 797,869. Class 9. Electrical apparatus and instruments, etc. Inductive Appliances Ltd., 4 St. Nicholas Bldgs, St. Nicholas St. Newcastle upon Tyne 1.

Tylec. 808,287. Class 9. Control panels for lighting, heating and power installations, etc. Troughton and Young (Manufacturers) Ltd., Imperial Ct, Basil St, Knightsbridge, S.W.3.

Viking. 800,671. Class 7. Washing, drying, rinsing, hair drying machines, etc. North Western Specialities Ltd., Castle Wks, Stalybridge, Ches.

Vibret. 807,103. Class 9. Electronic instruments. Electronic Instruments Ltd., Lower Mortlake Rd, Richmond.

MEETINGS TO NOTE

THURSDAY, 2 MARCH

I.E.E. "The Place of Formal Study in the Post-Graduate Training of an Electrical Engineer," N. N. Hancock and P. L. Taylor. Savoy Pl, W.C.2. 5.30 p.m.

I.E.E. (Cambridge Electronics and Measurement Group). "Engineering and the Brain," R. L. Gregory. Cavendish Laboratory, Cambridge. 8 p.m.

I.E.E. (E. Midlands). "Transistors and All That," L. J. Davies. De Montfort Hall, Leicester. 7.15 p.m.

I.E.E. (Cardiff Graduates and Students). "Electrical Engineering Requirements in the Modern Steel Rolling Industry," J. L. Brace. Glamorgan College of Technology, Treforest. 7 p.m.

CHELMSFORD ENGINEERING SOCIETY. "Land Drainage and Sea Defence Works of the Essex River Board," E. L. Snell. Hoffmann's Social Hall. 7.30 p.m.

I.E.S. (Glasgow). "27 Years of Stage Lighting," F. P. Bentham. A.G.M. British Lighting Council. 29 St. Vincent Pl. 6.30 p.m.

A.S.E.E. (Brighton, Hove and District). "Electrical Interlocking with the Aid of Radio Isotopes," F. J. Burridge. New Imperial Hotel, First Ave, Hove. 7.30 p.m.

A.S.E.E. (Southampton). "The Manufacture and Applications of Transistors," E. Wolfendale. Polygon Hotel. 7.30 p.m.

BRITISH INSTITUTION OF RADIO ENGINEERS (N. Western). "Some Typical Uses for Electronic Data Processing Systems," C. W. Blaxter. Reynolds Hall, College of Technology, Manchester. 7 p.m.

FRIDAY, 3 MARCH

I.E.E. (Medical Electronics Group). Discussion: "The Clinical Value of E.E.G. Recording" and "Present Trends in General Purpose E.E.G. Recorders." Savoy Pl, W.C.2. 6 p.m.

I.E.E. (N. Midlands). Annual dinner-dance. Cairn Hydro Hotel, Harrogate. 7 p.m.

I.E.E. (S.E. Scotland). "Blaenau Ffestiniog and other Medium-Head Pumped Storage Schemes in Great Britain," H. Headland. (Joint meeting with the Scottish Branch of the Institution of Mechanical Engineers.) North British Hotel, Edinburgh. 6.30 p.m.

I.E.E. (N. Eastern). "Measured and Electrical Model Characteristics of Buildings Heated by Floor Thermal Storage," E. D. Taylor, B. Berger and G. Blaylock. Carlisle Technical College. 7 p.m.

BIRMINGHAM ELECTRIC CLUB. Ladies' Evening. Grosvenor Suite, Grand Hotel. 7.30 p.m.

I.E.S. (Edinburgh). Annual supper and dance. Carlton Hotel.

I.E.S. (Nottingham). Ladies' Evening. George Hotel.

INSTITUTION OF PLANT ENGINEERS. "Kariba Hydro-electric Scheme" film, introduced by T. A. L. Paton. Pepys Hse, 14 Rochester Row, S.W.1. 7 p.m.

MONDAY, 6 MARCH

I.E.E. (Electronics and Communications Section). "An Investigation of the Usefulness of Back-Scatter Sounding in the Operation of H.F. Broadcasting Services," E. D. R. Shearman. Savoy Pl, W.C.2. 5.30 p.m.

I.E.E. (Maidstone). "Safety in the Utilisation of Electricity," S. J. Emerson. Maidstone Technical College. 7 p.m.

I.E.E. (Western). "Short-Circuit Ratings for Mains Cables," G. S. Buckingham; and "A Basis for Short-Circuit Ratings for Paper Insulated Cables up to 11 kV," L. Gosland and R. G. Parr. M.E.B. Sub-Area H.Q., Gloucester. 6 p.m.

I.E.E. (N. Staffs). "The Future of 'Electrics' and 'Electronics' in Aircraft and Guided Missiles," The Rt Hon The Viscount Caldecote. English Electric Co., Kidsgrove. 7 p.m.

I.E.E. (S. Midlands). Discussion: "This House Deplores the Present Rate of World Expenditure on Space Research, While Many Problems of Extreme Poverty and Sickness Still Exist on an International Scale." (Joint meeting with Graduates and Students.) James Watt Memorial Institute, Birmingham. 6.30 p.m.

N.E. ELECTRICAL CLUB. "Infra-red Gas Analysis," A. E. Martin. County Hotel, Neville St, Newcastle upon Tyne. 6.30 p.m.

I.E.E. (N.E. Measurement and Electronics Group). "Applications of Microwaves," Professor A. L. Cullen. Rutherford College of Technology, Northumberland Rd, Newcastle upon Tyne. 6.15 p.m.

A.S.E.E. (Bolton). "Plastics in the Electrical Industry," A. J. Moulam. Railway Hotel. Trinity St. 7.45 p.m.

A.S.E.E. (Central London). "Contract Law and Agreements." White Hall Hotel, Bloomsbury Sq, W.C.1. 7.15 p.m.

Meetings to Note—continued

A.S.E.E. (Essex). "Suppression of Interference," A. C. F. Leadbitter. Angel Hotel, Ilford Broadway, 8.15 p.m.

A.S.E.E. (Leeds). "Electronics." Gt. Northern Hotel. 7.30 p.m.

TUESDAY, 7 MARCH

I.E.E. (Measurement and Control Section). "The Automatic Control of Machines for Assembling Mechanical Components," A. V. Hemingway and R. L. Dressler. Savoy Pl, W.C.2. 5.30 p.m.

I.E.E. (N.W. Utilisation Group). "Electricity Generation and Transmission for a Group of Chemical Works," F. H. Merrill. Engineers' Club, Albert Sq, Manchester. 6.15 p.m.

I.E.E. (N. Eastern). "Measured and Electrical Model Characteristics of Buildings Heated by Floor Thermal Storage," E. D. Taylor, B. Berger and G. Blaylock. Workington College of Further Education. 7 p.m.

I.E.E. (S.E. Scotland). "An Oscillating Synchronous Linear Machine," E. R. Laithwaite and R. S. Mamak. Carlton Hotel, Edinburgh. 7 p.m.

I.E.E. (Southern Graduates and Students). "D.C. Amplifiers," H. Kemhadjian. Farnborough Technical College. 6.30 p.m.

I.E.E. (Rugby Graduates and Students). "Controlling the Manchester-Crewe Multiple Unit a.c. Trains," R. W. Spedding. Rugby College of Engineering Technology. 6.30 p.m.

IDEAL HOME EXHIBITION at Olympia until 3 April.

INSTITUTION OF CIVIL ENGINEERS. (Joint meeting with the Royal Institute of British Architects.) "The Problem of Housing Large-scale Plant," W. S. Atkins and H. Lobb. Gt. George St, S.W.1. 5.30 p.m.

A.S.E.E. (Reading and Districts). "Panelec Floor-warming System," D. W. Ackery. College of Further Education, Bourne Rd, Maidenhead. 7.30 p.m.

A.S.E.E. (W. London). "Power Factor Correction," G. E. Bishop. White Hart, 49 Kings Rd, S.W.3. 7.45 p.m.

WEDNESDAY, 8 MARCH

I.E.E. (Southern). "A Survey of Street Lighting and Its Future," W. R. Stevens and H. M. Ferguson. S.E.B. Showrooms, Salisbury. 6.30 p.m.

I.E.E. (S.W. Scotland). "New Ideas in Aircraft Electrical Systems," M. Hancock. Institution of Engineers and Shipbuilders, 39 Elmbank Cres, Glasgow. 6 p.m.

I.E.E. (N. Midlands). "Radiocommunication in the Power Industry," E. H. Cox and R. E. Martin. Joint meeting with Sheffield Sub-Centre at the Town Hall, Barnsley. 7 p.m.

I.E.E. (N. Western). Annual dinner. Midlands Hotel, Manchester. 6.45 p.m.

I.E.E. (Oxford). "Automatic Warehousing," C. G. Bailey. S.E.B. District Office, 37 George St. 7 p.m.

I.E.E. (Bristol Graduates and Students). Joint meeting with Institution of Mechanical Engineers. "Servomechanism Engineering," Professor E. B. Pearson. College of Technology, Bristol. 7 p.m.

WOMEN'S ENGINEERING SOCIETY (London). Members' Evening. "Hope Hse," 45 Great Peter St, Westminster, S.W.1. 7 p.m.

NEWPORT AND DISTRICT ELECTRIC CLUB. "The Art of Public Speaking," G. J. Rankin. King's Head Hotel. 6.30 p.m.

BRITISH INSTITUTION OF RADIO ENGINEERS (Scottish). "High Speed Pulse Techniques," E. Wolfendale. Dept. of Natural Philosophy, The University, Drummond St, Edinburgh. 7 p.m.

BRITISH INSTITUTION OF RADIO ENGINEERS (N. Eastern). "V.H.F. A.M./F.M. Transistor Receivers," H. A. Heins. Institute of Mining and Mechanical Engineers, Neville Hall, Westgate Rd, Newcastle upon Tyne. 6 p.m.

BRITISH INSTITUTION OF RADIO ENGINEERS (S. Wales). Discussion: "The Radio and Electronics Industry in South Wales." Welsh College of Advanced Technology, Cardiff. 6.30 p.m.

A.S.E.E. (Birmingham). "Criminal Investigation." Det. Inspector Ellis. Birmingham Exchange and Engineering Centre, Stephenson Pl. 7.30 p.m.

A.S.E.E. (Luton). "Electronic Control of Machine Tools," O. S. Puckle. Luton College of Technology, Park Sq. 8.15 p.m.

A.S.E.E. (W. Kent). "Electricity and Road Transport," C. T. Humpidge. Royal Star Hotel, Maidstone. 7.30 p.m.

THURSDAY, 9 MARCH

I.E.E. (Supply Section). Dinner-dance. Connaught Rooms, W.C.2. 7.30 p.m.

I.E.E. (N. Scotland). "Generator/Motor Problems in Pumped-Storage Installations," J. H. Walker. Electrical Engineering Dept., Queen's College, Dundee. 7 p.m.

I.E.E. (W. Wales). "Some Considerations in the Application of Power Rectifiers and Converters," J. P. McBreen. Conference Room, S.W.E.B., The Kingsway, Swansea. 6 p.m.

I.E.E. (Irish). "Design Manufacture and Service Performance of Rural Transformers in Ireland," W. G. Scaife and M. P. Kealy. Physical Laboratory, Trinity College, Dublin.

SOCIETY OF INSTRUMENT TECHNOLOGY (Liverpool). "Design Application and Selection of Automatic Control Valves," P. Stone. M.A.N.W.E.B. Industrial Development Centre. 7 p.m.

I.E.S. (Manchester). "Blackpool Illuminations," H. Carpenter. Illuminations and Electrical Services Department, Rigby Rd, Blackpool. 2.30 p.m.

I.E.E. (N.E. Graduates and Students). "Distribution Planning," P. A. Balmbra. Sunderland Technical College. 6.30 p.m.

BRITISH INSTITUTION OF RADIO ENGINEERS (Scottish). "High Speed Pulse Techniques," E. Wolfendale. Institution of Engineers and Shipbuilders, 39 Elmbank Cres, Glasgow. 7 p.m.

A.S.E.E. (Bradford and District). "Trolleybus Control," D. Francis. The Midland Hotel. 7.30 p.m.

FRIDAY, 10 MARCH

I.E.E. (N. Eastern). Annual dinner and dance. Old Assembly Rooms, Newcastle upon Tyne. 7 p.m.

SOCIETY OF INSTRUMENT TECHNOLOGY (Midlands). "Control Problems of Nuclear Power Stations," R. B. Quarmby. Lecture Theatre of the Byng Kendrick Suite, at the Gosta Green College of Technology, Aston St, Birmingham. 7 p.m.

I.E.S. (Bath and Bristol). Dinner and dance. Hawthorns Hotel.

SATURDAY, 11 MARCH

I.E.E. (Sheffield Graduates and Students). Week-end Conference at Bridlington.

MONDAY, 13 MARCH

I.E.E. Discussion: "Town Planning and Electrical Requirements." Savoy Pl, W.C.2. 5.30 p.m.

I.E.E. (E. Anglian). Discussion: "The Broadening of University Engineering and Science Courses." Technical College, Cambridge. 6.30 p.m.

I.E.E. (Western). "Silicon Power Rectifiers," A. J. Blundell, A. E. Garside, R. G. Hibberd and I. Williams. S.W.I.E., Cardiff. 6 p.m.

I.E.E. (N. Eastern). "A Basis for Short-circuit Ratings for Paper-insulated Cables up to 11 kV," L. Gosland and R. G. Parr; "Short-circuit Ratings for Mains Cables," G. S. Buckingham. Neville Hall, Newcastle upon Tyne. 6.30 p.m.

I.E.E. (S. Midlands Supply and Utilisation Group). "The Determination of the Electrical Characteristics of an Arc Furnace," J. Ravenscroft. College of Advanced Technology, Gosta Green, Birmingham. 6 p.m.

I.E.E. (Scottish Electronics and Measurement Group). Discussion: "Digital Transducers." Royal College of Science and Technology, Glasgow. 6 p.m.

INSTITUTION OF MECHANICAL ENGINEERS. Discussion: "Cybernetics." 1 Birdcage Walk, S.W.1. 9.45 a.m.

SOCIETY OF INSTRUMENT TECHNOLOGY (Bristol). "The Industrial Use of Precision Scales," P. A. McKeown. University of Bristol, Dept. of Physics, The Royal Fort. 7.30 p.m.

GOBLIN (B.V.C.) LIMITED

(Originators of the Vacuum Cleaner)

Plea for Firm Government Policy

THE 57th Ordinary General Meeting of Goblin (B.V.C.) Limited was held on February 23 at Leatherhead.

Mr. O. D. Angell, Chairman, presided and, in the course of his speech, said:

It was my pleasure a year ago to report a net profit of over one-quarter of a million pounds, and I told you that we were in a good position to take our share of the improved trading brought about by freedom from hire purchase and credit controls. The results were such that we decided to recommend the highest payment of dividend ever made by your Company.

At that time the outlook held great promise for a new record year of trading, which promise was to be rudely disturbed by the harsh and sudden resumption of the controls above referred to. The home market for certain of our domestic appliances contracted over-night and our battle to maintain profitable production began.

While it may be necessary for the Government from time to time to take steps to control inflation and balance of payments, it certainly creates problems in our Domestic Industry. The sudden changes of Government policy cancel out the best of planning. Our plea to those in authority is to give us continuity of policy and allow us to develop the essential Home trade which establishes the very necessary starting point for a strong Export trade. We say to the Government, "decide upon your policy, announce it, and then allow us to plan and develop in accordance with your terms."

Of this we are sure, our Goblin products are good value and our domestic turnover will not compare unfavourably with the figures of the Trade. The Goblin "Teasmade" is a record seller and the range of Goblin Cleaners is well received. The sales of other Goblin products are also showing promise. Our experience in the Export market has been encouraging but only to the degree in which we have been able to keep our prices competitive in spite of the unsettled home markets.

Diversification

During my few years as Chairman, I have told you of the efforts of your Board to render the fortunes of the Company less vulnerable to extreme fluctuation, and I now propose to discuss some of these aspects of development within our Group.

The Specialised Electric Motor manufacturing has proceeded as planned and is continuing to be a worth while development.

Our Industrial Vacuum Cleaner division is ever expanding and results to date give us every confidence in our growing future in this sphere.

Our Magneta subsidiary has received much attention and here again we believe we are capable of substantially expanding our activities. This division markets Time Recorders, Clock systems and Public Address equipment.

Our export situation in this sphere of activity has shown very substantial growth and we are confident will continue so to do.

Our subsidiaries abroad are trading well with the exception of Canada. We have a subsantial stake in the Canadian market and we are aware that we must meet the existing conditions by a completely new sales outlook. This year we have already taken important steps towards meeting this situation.

Throughout our Organisation we are conscious of the necessity to diversify, and developments to this end give good grounds for encouragement.

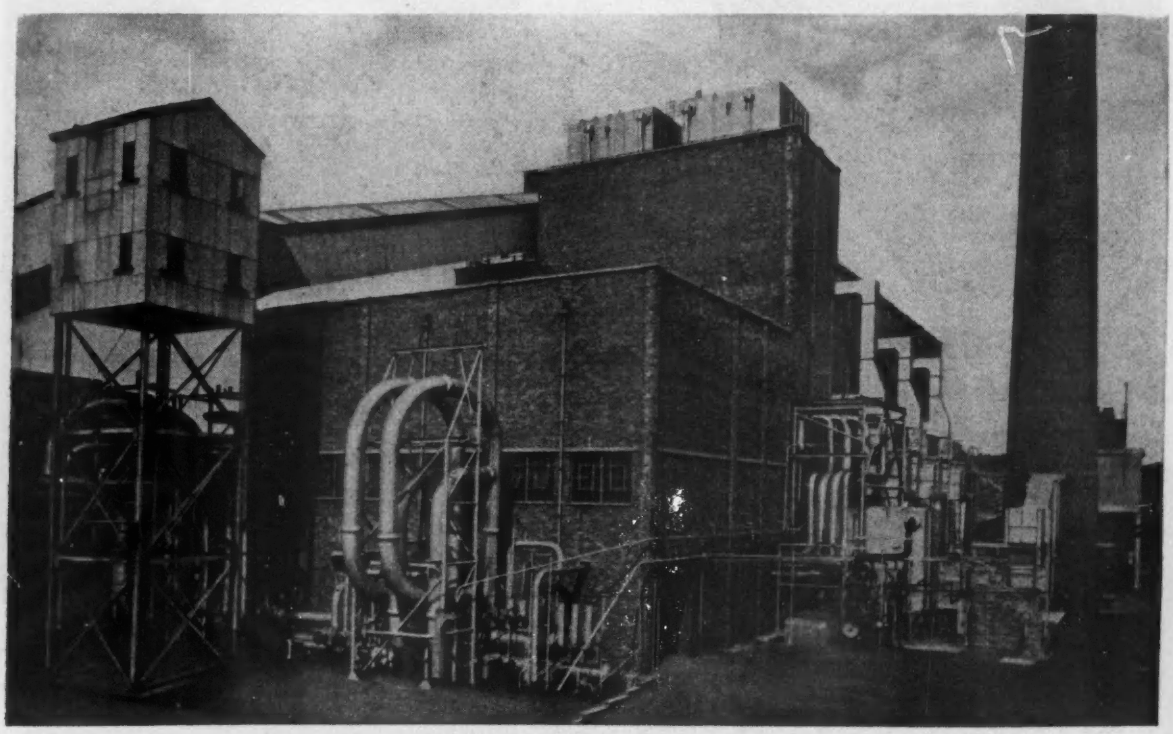
The Report and Accounts were adopted and the proposed Ordinary dividend of 10%, less tax, was approved.

POWER W G

Imperial Chemical Industries Limited (Nobel Division) Ardeer

The major power generating plant for I.C.I.'s works at Ardeer was built by Richardsons Westgarth. The contract included three 85,000 lb./hr. 2-drum, natural-circulation boilers to Foster-Wheeler design, and two turbo-alternators of Brown-Boveri design—one of 8,500 kW and the other of 1,250 kW. Richardsons Westgarth also undertook the responsibility for the complete erection of the powerhouse, including all ancillary equipment, pipework, foundations and buildings. This is one of several industrial power plants which have been installed, in their entirety, by Richardsons Westgarth. In addition to boilers for specific installations, Richardsons Westgarth also make a standard range of packaged gas and oil-fired units which generate steam up to 875°F and 1350 p.s.i.g., with capacities up to 67,500 lb./hr. Because they are standard, these units can offer advantages in price and delivery over boilers specially built for a single installation.

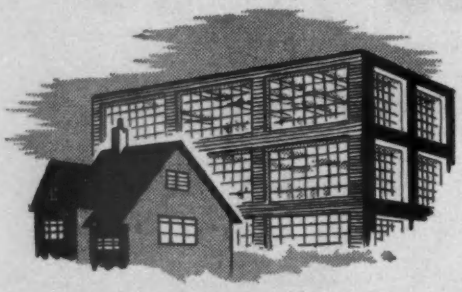
We are exhibiting on Stand 7, Row G, Ground Floor, at the Engineering, Marine, Welding and Nuclear Energy Exhibition, Olympia, April 20th to May 4th, 1961.



RICHARDSONS WESTGARTH (HARTLEPOOL) LTD.

A member of the RICHARDSONS WESTGARTH GROUP
HARTLEPOOL, CO. DURHAM and at 58 VICTORIA STREET, LONDON, S.W.1.
59 MOSLEY STREET, MANCHESTER, 75 BUCHANAN STREET, GLASGOW. RW 77

CRYSELCO



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CLASSIFIED ADVERTISEMENTS

TENDERS INVITED

GHANA SUPPLY COMMISSION
Tender for Supply of PVC Insulated Cadmium Copper and Hard Drawn Copper Wire

THE Ghana Supply Commission invite manufacturers to apply for tender for the supply of the following:

Ref.: PAT 4082/1. Description:
(a) 66,000 yds of p.v.c. Insulated Cadmium Copper Wire.
(b) 34¼ tons Bare Hard Drawn Copper Wire.

Forms of tender and conditions of contract will be obtainable from 15 March, 1961, on payment of a fee of £1, from the Secretary, Ghana Supply Commission, P.O. Box M35, Accra, Ghana.

Forms of tender will not be issued after 5 April, 1961. The closing date for receipt of tenders will be 12 April, 1961. (A 52)

BOROUGH OF TAMWORTH
Street Lighting on roads within the Borough

TENDERS are invited for the supply, delivery, erection and wiring complete of the following lighting units:

1. 53 No. 200 watt Sodium Lighting units on 30 ft steel columns.
2. 14 No. 250 watt Colour Corrected Mercury Lighting units on 25 ft steel columns.
3. 20 No. 250 watt Colour Corrected Mercury Lighting units on 25 ft concrete columns.
4. 22 No. 80 watt Colour Corrected Mercury Lighting units on 15 ft concrete columns.

Copies of the Contract Drawings may be inspected at the office of the undersigned, from whom copies of the Form of Tender, General Conditions of Contract and Specification may be obtained.

Tenders in plain sealed envelopes, endorsed STREET LIGHTING must be delivered to H. B. Leake, Esq., Town Clerk, Municipal Offices, Tamworth, not later than Monday, 27 March, 1961.

H. F. Bruce Smith, M.I.MUN.E.,
Borough Engineer and Surveyor.
Municipal Offices,
Tamworth.
24 Feb., 1961. (A 70)

STEVENAGE DEVELOPMENT CORPORATION

TENDERS are invited for the Corporation's Street Lighting Contract for 1961/62.

This includes the provision and erection of approximately 200 new aluminium columns and lanterns during any 12 months, and the provision of a continuous maintenance service to deal with damage and emergencies at Stevenage.

Documents may be obtained from G. E. Hardy, A.M.I.C.E., M.I.MUN.E., Chief Engineer, Daneshill Hse, Danestrete, Stevenage, Herts.

Tenders must be returned not later than 5 p.m. on Thursday, 16 March, 1961. (A 40)

CITY OF HEREFORD
Electrical Installation to (a) 5 Bungalows and Garages-Home Lane (b) 12 Bungalows and Garages-Hillside Avenue

TENDERS are invited for the wiring for electricity to 17 bungalows with garages on two adjoining sites as above. Plans, specification and forms of tender may be obtained from the City Architect, Town Hall, Hereford, upon the deposit of £1 (returnable following the submission of a bona fide tender and return of all documents.)

SEPARATE TENDERS for each site should be returned in the envelope provided and endorsed "Electrical Installation—Bungalows—Home La and Hillside Ave," to reach the undersigned not later than 12 noon on Monday, 20 March, 1961.

J. A. WESTON,
Town Clerk.
Town Hall,
Hereford. (A 78)

APPOINTMENTS VACANT

MERSEYSIDE AND NORTH WALES ELECTRICITY BOARD
ASSISTANT SUB-AREA ACCOUNTANT
FRODSHAM, NEAR RUNCORN

THIS post will become vacant in May, 1961, and applications are invited from qualified accountants.

The position is immediately subordinate to the Sub-Area Accountant who, under the Manager of the Sub-Area, is responsible for the running of the financial and accounting functions in the Board's operating unit covering mid-Cheshire and the towns of St. Helens, Warrington and Widnes in Lancashire.

It calls for experience and success in running a substantial accounts office, an up-to-date outlook on accounting aids to management and some aptitude for methods work.

In this growing industry there are good prospects for advancement for the right man.

Salary within range £1,680/£1,800 per annum (N.J.C. Grade 10).

Good staff conditions. Pension Scheme. Appointment subject to medical examination.

Write in the first instance, giving brief but comprehensive personal details, to the Manager, No. 2 Sub-Area, Sandiway Hse, Northwich, Cheshire. A form for formal application will then be supplied. Closing date: 14 March, 1961. (A 67)

NORTH OF SCOTLAND HYDRO-ELECTRIC BOARD
ASSISTANT SHIFT CHARGE ENGINEER
CAROLINA PORT POWER STATION

A VACANCY, as above, will shortly occur at the 75 MW Dundee Power Station. Applicants should be of H.N.C. or equiavlent standard and preferably with experience of Power Station operation.

The post is superannuable, the salary being in accordance with Class F/9, Scale 6, of the N.J.B. Agreement, being at present £890/£1,015, plus 10% shift enhancement.

Application should be made on the standard form obtainable from the Area Manager, North of Scotland Hydro-Electric Board, Dudhope Crescent Rd, Dundee, and be submitted by 22 March, 1961. (A 63)

CITY OF CARDIFF EDUCATION COMMITTEE
Llandaff Technical College

Principal: J. Cotterell,
M.I.E.E., A.I.MECH.E., A.M.I.PROD.E.
DEPARTMENT OF ELECTRICAL ENGINEERING

APPLICATIONS are invited for the post of
ASSISTANT LECTURER
Grade B, in the Electrical Engineering Department—duties to commence as soon as possible.

The Department provides Sandwich, Block Release and Part-time Day Courses for O.N.C. City and Guilds Technicians, Installation and Radio. The successful applicant will be required to teach electrical engineering up to S.3 O.N.C. standard. Applicants should possess suitable technical qualifications, e.g., Degree, A.M.I.E.E. or H.N.C. in Electrical Engineering, together with industrial experience. Teaching experience would be an advantage.

Salary for this post is in accordance with the Burnham Technical Scale for Assistant Lecturers. Grade B: £700 x £27 10s—£1,150.

An addition of up to 12 annual increments may be made to the starting salary for approved industrial or teaching experience, and additional payment may be made for approved training.

Further particulars and application forms can be obtained from the undersigned, to whom they should be returned within 14 days of the appearance of this advertisement.

ROBERT E. PRESSWOOD,
Director of Education.
City Hall,
Cardiff. (A 24)

CENTRAL ELECTRICITY GENERATING BOARD
North Eastern and Yorkshire Region

STATION CHEMIST
MEXBOROUGH POWER STATION

APPLICATIONS are invited for the appointment of Station Chemist at Mexborough Power Station.

Applicants should possess a Higher National Certificate in Chemistry and have had previous power station experience. A knowledge of the operation and control of modern water treatment plants will be an advantage.

The salary for the appointment will be in accordance with the National Joint Board Agreement (Schedule A), Class G, Grade 7 (£1,115/£1,245 per annum).

Forms of application may be obtained from the Assistant Regional Secretary (Personnel), Central Electricity Generating Board, North Eastern and Yorkshire Region, 1 Whitehall Rd, Leeds 1, to whom they should be returned to arrive not later than 13 March, 1961. (A 25)

THE NORTH WESTERN ELECTRICITY BOARD
FIRST ASSISTANT DISTRICT ENGINEER
LEIGH DISTRICT

THE successful applicant will be required to assist the District Engineer in the construction, operation and maintenance of the 33 kV, 11 kV and 6·6 kV systems, and the planning of the 11/6·6 kV and L.V. networks.

Corporate Membership of the Institution of Electrical Engineers will be an advantage.

Salary Scale: £1,650/£1,830 p.a., Grade J.3. N.J.B. Conditions.

Applications on forms to be obtained from the Manager, No. 2 Sub-Area, The North Western Electricity Board, 2 St. George's Rd, Bolton, and returned to him by 13 March, 1961.

FOREMAN
OLDHAM DISTRICT

The successful candidate will be required to supervise cable laying and jointing and the erection and maintenance of overhead lines up to and including 33 kV.

Salary: £795 p.a., Grade 2, Schedule E. N.J.I.C. Conditions.

Applications to Manager, No. 3 Sub-Area, The North Western Electricity Board, Union St, Oldham, by 18 March, 1961. (A 65)

Advertisements should be sent to the Classified Advertisement Dept., Electrical Times, Sardinia House, Sardinia Street, London, W.C.2, before 10 a.m. on TUESDAY of the week of issue. Official Displayed Advertisements are charged at 46s. per inch, and all other classified advertisements at 3s. 6d. per line. Situations Wanted four insertions at twice the single insertion rate. Fee for Box Number and postage on replies 2s.

CENTRAL ELECTRICITY GENERATING BOARD

London Division

APPLICATIONS are invited for the following superannuable posts. Conditions of service in accordance with N.J.B. Agreement, Schedule A and B. Salary includes London Allowance.

ASSISTANT OPERATION SUPERINTENDENT
BRUNSWICK WHARF POWER STATION
Vacancy No. 61/102.

To assist the Operation Superintendent in the efficient running of the generating plant and to be responsible for the statistical returns required by the Generating Board. Applicants should preferably be qualified to H.N.C. standard and have experience in routine testing of boiler and turbine plant. Salary: Class K, Grade 6, £1,500/£1,670 per annum.

MAINTENANCE ENGINEER (ELECTRICAL)
WEST HAM POWER STATION
Vacancy No. 61/111.

Candidates should have had workshop training with wide general experience of power station electrical equipment and practical experience of E.H.T. switchgear and protective gear. Qualifications entitling to Corporate Membership of the I.E.E. or I.Mech.E. an advantage. Salary: Class H, Grade 6, £1,325/£1,460 per annum.

Previous applicants need not re-apply.

THIRD ASSISTANT ENGINEER
ELECTRICAL DEPARTMENT
TRANSMISSION SECTION
DIVISIONAL HEADQUARTERS
GENERATION HOUSE
Vacancy No. 61/112.

Applicants for this vacancy which occurs in the South Section of the Division, should preferably be Corporate Members of the I.E.E. or hold equivalent qualifications, should have had considerable experience in the operation and maintenance of high voltage overhead lines and cables, switchgear (oil-filled and air blast) and transformers. They must also have had considerable experience in the operation of the Board's Safety Rules and in the control of both technical and manual staff, and be familiar with the Board's negotiating machinery. Salary: Class BX, Grade 8. From 1.7.60.: £1,155/£1,460 per annum. From 1.7.61.: £1,195/£1,460 per annum.

Applications, quoting vacancy no. to (or on form from) Personnel Officer, Central Electricity Generating Board, London Division, P.O. Box No. 136, London W.1, by 14 March, 1961. (A 46)

THE NORTH EASTERN ELECTRICITY BOARD

APPLICATIONS are invited from suitably qualified engineers for the following appointments which are subject to the conditions of the National Joint Board.

Area Board Headquarters

THIRD ASSISTANT ENGINEER
CHIEF COMMERCIAL OFFICER'S DEPARTMENT
MINING SECTION, NEWCASTLE

Applicants should have a sound technical training and a good knowledge of the use of electricity by all classes of industrial consumers. Duties will include negotiations with consumers.

Salary: Schedule B, Class AX, Grade 8, £1,105/£1,325 per annum.

Wear Sub-Area

THIRD ASSISTANT DISTRICT ENGINEER
DURHAM

Applicants must have had sound practical training and experience in the construction, operation and maintenance of h.v., m.v. and l.v. overhead and underground distribution networks, substation plant and auxiliary equipment.

Salary: Schedule A, Class G, Grade 9, £965/£1,090 per annum.

Applications, stating age, qualifications and experience, to be received by Assistant Secretary (Establishments), The North Eastern Electricity Board, G.P.O. Box 117, Carliol Hse, Newcastle upon Tyne 1, within ten days of the appearance of this advertisement. (A 61)

SOUTH WESTERN ELECTRICITY BOARD

SECOND ASSISTANT ENGINEER
(DESIGN AND CONSTRUCTION)
DEVON GROUP (EXETER)

SALARY within Class K, Grade 8, Salary Scale 11, £1,275/£1,410 per annum, of the N.J.B. Agreement.

The duties of the successful candidate will include the selection of line and cable routes, of substation sites, the design of substations and switching stations, and preparation of estimates; also, the preparation of constructional programmes and liaison with other departments of the Board and with outside Authorities.

Applicants should possess a wide knowledge and experience of the Planning and Construction of Distribution systems covering overhead lines, underground cables and substations up to 33 kV. Some operational experience is necessary. Qualifications equivalent to Corporate Membership of the Institution of Electrical Engineers are most desirable.

Applications to be made on Standard Form AE6/ACT, OBTAINABLE BY POST-CARD ONLY from the Group Administrative Officer, South Western Electricity Board, 57 Paul St, Exeter. Closing date for receipt of completed applications is 18 March, 1961.

THIRD ASSISTANT ENGINEER (PLANNING)
CHIEF ENGINEER'S DEPARTMENT
HEAD OFFICE, BRISTOL

Salary according to Class AX, Grade 7, Salary Scale 11, £1,275/£1,410 per annum, of the N.J.B. Agreement.

The successful candidate will be responsible for the use of a 50-cycle A.C. Network Analyser in carrying out investigations into numerous and varied H.V. network problems. From time to time he may be required to assist generally in the Planning or the Technical Section.

Applicants should be in possession of the Higher National Certificate in Electrical Engineering, or equivalent qualification, and some experience in 33 kV and 11 kV planning would be an advantage.

This post would provide an admirable opportunity for a young engineer wanting to specialise in some degree in planning to acquire concentrated experience.

Applications to be made on Standard Form AE6/ACT OBTAINABLE BY POST-CARD ONLY from the Establishments Officer, South Western Electricity Board, Electricity Hse, Colston Ave, Bristol 1. Closing date for receipt of completed applications is 18 March, 1961. (A 64)

SOUTH EASTERN ELECTRICITY BOARD

ASSISTANT ENGINEER
(OPERATION AND MAINTENANCE)
CROYDON AND WEST KENT AREA
HEADQUARTERS

SALARY: N.J.B. Class K, Grade 10, £1,165/£1,295 per annum, including London Allowance. Superannuable.

Candidates should be either corporate or graduate members of the Institution of Electrical Engineers and have had experience in the operation and maintenance of distribution systems up to and including 33 kV.

Applications, quoting ET and naming two referees, on forms from the Croydon and West Kent Area Manager, Electric Hse, Wellesley Rd, Croydon, by 15 March, 1961.

ASSISTANT DISTRICT ENGINEER
CROYDON AND PURLEY DISTRICT

Salary: £1,165/£1,295 per annum, including London Allowance, under N.J.B. Agreement, Class J, Grade 9. Superannuable.

Applicants should be suitably qualified and have operational experience of maintenance and construction on distribution system, up to 11 kV. Candidates should also have experience of planning work.

Applications, quoting ET and naming two referees, on forms obtainable from District Manager, Seeboard, Electric Hse, Wellesley Rd, Croydon, by 15 March, 1961.

ASSISTANT DISTRICT ENGINEER
GUILDFORD DISTRICT

Salary: £1,040/£1,165 under N.J.B. Class F, Grade 7. Superannuable. Preference given to applicants with technical qualifi-

continued in next column

continued from previous column

cations up to H.N.C. standard and with practical experience of the planning, construction, operation and maintenance of M.V. and 11 kV underground and overhead systems. Consideration will be given to a private car allowance and assistance in house purchasing in appropriate circumstances. The successful applicant will be required to undertake standby duties.

Applications, quoting ET and naming two referees, on forms from District Manager, Seeboard, Woodbridge Rd, Guildford, Surrey, by 15 March, 1961.

ASSISTANT DISTRICT ENGINEER
WOKING DISTRICT

Salary: £765/£870 p.a. under N.J.B. Agreement, Class F, Grade 11. Superannuable. This appointment occurs in a rapidly expanding urban and rural district. Applicants should have minimum qualification of the O.N.C. in electrical engineering and should possess general engineering experience preferably in the electricity supply industry.

Applications, quoting ET, on forms from District Manager, Seeboard, 4 Chobham Rd, Woking, Surrey, by 15 March, 1961.

ASSISTANT DISTRICT ENGINEER
TWICKENHAM AND RICHMOND DISTRICT

Salary: £1,040/£1,165 p.a. plus London Allowance, under N.J.B. Class F, Grade 7. (Re-classification to Class G in April, 1961.) Superannuable. Preference given to applicants with technical qualifications up to H.N.C. standard and with practical experience of the planning, construction, operation and maintenance of M.V. and 11 kV underground systems. Consideration will be given to a private car allowance and assistance in house purchasing in appropriate circumstances. The successful applicant will be required to undertake standby duties.

Applications, quoting ET, on forms from District Manager, Seeboard, 42 York St, Twickenham, Middlesex, by 15 March, 1961.

GEORGE WRAY,
Secretary.
(A 62)

EASTERN ELECTRICITY BOARD

APPLICATIONS are invited for the following appointments. The successful candidates will be required to contribute to a superannuation scheme and may be required to undergo a medical examination.

Norfolk Sub-Area

THIRD ASSISTANT ENGINEER (MOBILE)
35/61.N.

The successful applicant will be based in the Sub-Area Engineer's Department at Norwich, but will be required to operate anywhere within the Norfolk Sub-Area as required.

Candidates should have had a sound technical training and experience in the planning, construction, operation and maintenance of overhead and underground distribution systems, including substations.

Salary: N.J.B. Class K, Grade 9 (£1,190/£1,325).

Apply by letter to the Manager, Eastern Electricity Board, Norfolk Sub-Area, 4 Duke St, Norwich, Norfolk, by 17 March, 1961.

Northmet Sub-Area

GENERAL ASSISTANT ENGINEER
(CLERK OF WORKS)
CIVIL ENGINEERING AND BUILDING SECTION
SUB-AREA ENGINEER'S DEPARTMENT
(Ref. 1039) 37/61.R.

Candidates should have had a good general and technical education, possess a sound knowledge of practical building and civil engineering construction and be capable of setting out and supervising site works.

Salary: N.J.B., Class N, Grade 16 (£940/£1,065) inclusive of London Allowance.

Apply by letter to the Manager, Eastern Electricity Board, Northmet Sub-Area, Northmet Hse, Southgate, London N.14, by 17 March, 1961. (A 58)

UNITED KINGDOM TECHNICAL ASSISTANCE

EXPERT IN ELECTRICITY SUPPLY ECONOMICS AND TARIFFS STRUCTURES

REQUIRED for six months in Dacca, East Pakistan, to advise the Government on formulating revised tariffs. Candidates should be not less than 35 years and have wide experience in formulation of supply tariffs, methods of metering, revenue collection and billing.

Salary: £3,000/£4,000 p.a. (subject to U.K. income tax) according to qualifications and experience, plus tax-free allowances £1,690 per annum (married) and £960 per annum (single). Free furnished accommodation is provided or allowance in lieu. All emoluments paid by U.K. Government. Apply to Ministry of Labour (E.9), 26 King St, London S.W.1, quoting PAK/43. (A 55)

FEDERAL GOVERNMENT OF NIGERIA

ELECTRICAL INSPECTORS

MINISTRY OF MINES AND POWER

ELECTRICAL INSPECTORS required for inspection of electrical supply undertakings and large consumers' installations, such as factories, mines and oil wells, with a view to enforcement of the appropriate regulations.

Candidates should be corporate members of the Institution of Electrical Engineers, or eligible for membership. A university degree in engineering or a diploma issued by a recognised Electrical Engineering College or School, or both, would be an advantage. Knowledge of flameproof electrical installations is desirable. Experience of inspectorial work would be an advantage.

Salary, according to qualifications and experience, £1,434/£2,196 (including inducement addition), plus gratuity of £150 per annum for satisfactory service. Outfit allowance of £60 is paid on salaries of up to £2,040 (including inducement addition). Appointment will be on contract for one or two tours of 12-18 months (length of tour dependent on candidate's age). Free passages for officer and wife. Children's allowances whilst separated. Home and local leave on full pay. Income tax at low local rate. Rent at low cost.

Candidates should write for application forms and further particulars stating briefly age, qualifications and experience, to the Recruitment Attache, Office of the High Commissioner for Nigeria, Nigeria Hse, 9 Northumberland Ave, London W.C.2, quoting Q.1/4. (A 34)

CENTRAL ELECTRICITY GENERATING BOARD NORTH EASTERN AND YORKSHIRE REGION

Yorkshire Division

POWER STATION SUPERINTENDENT
THORPE MARSH POWER STATION

APPLICATIONS are invited for the appointment as Power Station Superintendent at the new Thorpe Marsh Power Station near Doncaster, designed for an ultimate capacity of 1,100 MW, comprising 2/550 MW units.

The first 550 MW unit will be commissioned in April, 1963, and the second in August, 1964.

Salary: £2,815/£3,040 per annum, Class F, Grade 5, of the National Joint Managerial and Higher Executive Grades salary scales.

Candidates should have had wide experience in the management of a large modern Power Station and possess good engineering qualifications.

Forms of application may be obtained from the Assistant Regional Secretary, (Personnel), Central Electricity Generating Board, North Eastern and Yorkshire Region, 1 Whitehall Rd, Leeds 1, to whom they should be returned to arrive not later than 20 March, 1961. (A 53)

YORKSHIRE ELECTRICITY BOARD

No. 1 (Bradford) Sub-Area

KEIGHLEY DISTRICT
THIRD ASSISTANT DISTRICT ENGINEER

APPLICANTS should have passed the Associate Membership Examination of the Institution of Electrical Engineers, or hold equivalent qualifications, and have experience in construction, operation and maintenance of high voltage systems, underground cables and overhead lines and substations, and medium low voltage networks.

Candidates should be prepared to reside within the District and undertake stand-by duties.

Salary: N.J.B. Class F, Grade 9 (Scale 6), £890/£1,015 per annum.

Applications, together with the names of two referees, should be sent to the Manager, No. 1 (Bradford) Sub-Area, Yorkshire Electricity Board, 45-53 Sunbridge Rd, Bradford 1, not later than 17 March, 1961. (A 59)

SOUTH OF SCOTLAND ELECTRICITY BOARD

Glasgow Area

VACANCY

APPLICATIONS are invited for the following superannuable post:

THIRD ASSISTANT ENGINEER
(METER, TESTING AND PROTECTION)

The duties connected with this post will be the maintenance of electrical standards and instrumentation of a Class A meter testing station; design and testing of complex metering installations; system fault location up to 33 kV; pressure testing of distribution systems, etc., up to 33 kV; and testing of power transformers and of insulating oils.

Preference will be given to suitably qualified candidates, and the possession of Graduateship of the Institution of Electrical Engineers or equivalent qualification would be an advantage.

The successful candidate would require to live within reasonable distance of the testing station and be prepared to undertake stand-by duties.

Salary: £1,190/£1,325 per annum in accordance with Class L, Grade 10 (Scale 10), of the N.J.B. Salary Scale.

Applications, quoting reference number G/14/61, should be made on the standard application form which may be obtained from and should be returned to the Area Secretary, South of Scotland Electricity Board, Glasgow Area, P.O. Box 6, 75 Waterloo St, Glasgow C.2, to be received not later than Thursday, 16 March, 1961.

L. HARVEY,
Manager.
(A 68)

WESSEX REGIONAL HOSPITAL BOARD

THERE are vacancies for the following posts in the Architect's Department to deal with the Board's expanding hospital building programme:

(a) PRINCIPAL ASSISTANT ARCHITECT
GRADE II
(£1,665 x £50(1) x £75(2) x £85(2)—£2,035)

(b) SENIOR ASSISTANT ARCHITECT
(£1,300 x £60(5)—£1,600)

(c) ASSISTANT ARCHITECTS
(£905 x £35(1) x £45(6) x £50(2)—£1,310)

Applicants must be Registered Architects. The work offers excellent opportunity for gaining experience in the whole field of hospital architecture and covers all stages from sketch plans to the supervision of construction. The proposed expansion of the Board's building programme ranges from major adaptation schemes to comprehensive new hospital projects, and includes all types of medical ancillary departments and domestic buildings.

(d) BUILDING OR QUANTITY SURVEYING ASSISTANT
(£625 x £30(8) x £35(1)—£960)

Applicants must have passed the Intermediate Examination of the R.I.C.S. or an examination giving exemption therefrom.

Please apply to the Secretary, Highcroft, Romsey Rd, Winchester, for application form which should be returned by 17 March. (A 45)

DEPARTMENT OF ELECTRICAL ENGINEERING

Kumasi College of Technology, Ghana

APPLICATIONS are invited for two posts of

TECHNICAL INSTRUCTORS

in the Department of Electrical Engineering.

Applicants must have had a sound technical education and should possess either the Higher National Certificate or Diploma. Some experience in Technical College work will be an advantage.

Successful candidates will take full-time classes in a four-year diploma course in Electrical Engineering, prepare and supervise laboratory work in Electrical Power Machines and Measurements, and assist in laboratory development and research work.

The Contract Salary is £1,295 x £56—£1,855.

In addition, children's allowances are paid up to a maximum of three, and a gratuity at the end of the contract at the rate of £150 for each year of satisfactory service. The entry point is fixed according to qualifications and experience.

The College is fully residential, and members of staff are housed in pleasant, modern bungalows on the spacious campus; climate and living conditions are good.

Annual leave with three free return passages in four years is granted to members of staff and their families.

Application forms and an Information Brochure may be obtained from the Assistant Registrar, Kumasi College of Technology, 29 Tavistock Sq, London W.C.1, who will also be glad to answer any questions about this appointment. The closing date for applications is 15 March, 1961. (A 54)

THE SOUTH WALES ELECTRICITY BOARD

ASSISTANT ENGINEER

APPLICATIONS are invited for the position of Assistant Engineer in the East Monmouthshire District (based at Chepstow) in the Monmouthshire and Mid-Wales Area.

Preference will be given to Engineers possessing a Higher National Certificate in Electrical Engineering.

Salary: N.J.B. Class G, Grade 7, Scale 9 (£1,115/£1,245 per annum).

Applications stating age, present position, present salary, qualifications and experience should be addressed to the Manager, Monmouthshire and Mid-Wales Area, Llwelyn Rd, Cwmbran, Mon, to arrive not later than 18 March, 1961.

Please quote reference 24/61/ET, endorsing envelope "Assistant Engineer."

R. G. WILLIAMS,
Secretary.
(A 77)

THE NORTH WESTERN ELECTRICITY BOARD

SENIOR SALES REPRESENTATIVE
(DEVELOPMENT)
WIGAN DISTRICT

APPLICANTS should be thoroughly conversant with supply matters, tariffs, apparatus and sales to domestic, commercial and small industrial consumers; have a good sales record and the capacity to progress in a live organisation.

The possession of the E.D.A. Salesmanship Certificate would be an advantage.

Salary scale: £700/£775 p.a. Grade 2. N.J.C. Conditions.

Applications on forms to be obtained from the Manager, No. 2 Sub-Area, The North Western Electricity Board, 2 St. George's Rd, Bolton, and returned to him by 13 March, 1961. (A 37)

CENTRAL ELECTRICITY GENERATING BOARD

East Midlands Division

STATION SHIFT CONTROL ENGINEER
DRAKELOW "A" POWER STATION
Vacancy No. 27/61.

APPLICATIONS are invited for the position of Station Shift Control Engineer at Drakelow "A" Power Station, near Burton-on-Trent, Staffs.

Applicants should have had a good general education and technical training with practical experience in the control and operation of large modern switchgear. Preference will be given to candidates who possess technical qualifications to Higher National Standard.

Salary will be in accordance with Class J, Grade 10 (£1,040/£1,165 per annum) of the National Joint Board Agreement, plus 10% allowance for shift duties.

Closing date for receipt of applications: 10 March, 1961.

ASSISTANT ENGINEERS (OPERATION)
HIGH MARNHAM POWER STATION
Vacancy No. 28/61.

Applications are invited for the positions of Assistant Engineers (Operation) at High Marnham Power Station, near Newark, Notts.

Applicants should have experience of the operation and control of modern High Pressure Boiler and Turbine Plant, and should possess a H.N.C. in Mechanical or Electrical Engineering, but consideration will be given to those holders of a lower technical qualification who have sound operating experience.

Salary will be in accordance with Class N, Grade 10 (£1,350/£1,500 per annum) of the National Joint Board Agreement, plus 10% allowance for shift duties.

Closing date for receipt of applications: 10 March, 1961.

ASSISTANT COAL AND ASH HANDLING ENGINEER
DRAKELOW "A" AND "B" POWER STATIONS
Vacancy No. 29/61.

Applications are invited for the position of Assistant Coal and Ash Handling Engineer at Drakelow "A" and "B" Power Stations, near Burton-on-Trent, Staffs.

Candidates should have knowledge of the operation of coal, ash and dust handling plant at a large modern power station, and of the organisation and planning of coal supplies by road and rail.

The duties of the successful applicant will include the organisation of ash disposal by lorry transport.

Salary will be in accordance with Class M, Grade 10 (£1,275/£1,410 per annum) of the National Joint Board Agreement.

Closing date for receipt of applications: 10 March, 1961.

SHIFT CHARGE ENGINEER
LEICESTER POWER STATION
Vacancy No. 34/61.

Applications are invited for the position of Shift Charge Engineer at Leicester Power Station, Rawdykes Rd, Leicester.

Applicants should preferably hold a Higher National Certificate and have had experience in a modern P.F. fired station.

Salary will be in accordance with Class G, Grade 7 (£1,115/£1,245 per annum) of the National Joint Board Agreement, plus 10% allowance for shift duties.

Closing date for receipt of applications: 17 March, 1961.

COAL AND ASH HANDLING ENGINEER
NOTTINGHAM POWER STATION
Vacancy No. 30/61.

Applications are invited for the position of Coal and Ash Handling Engineer at Nottingham Power Station, Queens Drive, Nottingham.

Applicants must have a wide experience of operation and maintenance at a large power station employing P.F. Boiler Plant.

Candidates should have suitable technical qualifications admitting to Corporate Membership of the Institution of Mechanical Engineers and/or the Institution of Electrical Engineers.

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The successful applicant will be responsible to the Station Superintendent for the programming of coal traffic and for the operation of the coal and ash plants.

Salary will be in accordance with Class K, Grade 8 (£1,275/£1,410 per annum) of the National Joint Board Agreement.

Closing date for receipt of applications: 10 March, 1961.

These appointments will be pensionable within the terms and conditions of the Electricity Supply (Staff) Superannuation Scheme.

Applications should be submitted on the official form AE6/ACT, which may be obtained from the Station Superintendent concerned, and should be returned to him by the date stated.

O. S. WOODS,
Divisional Controller.
(A 49)

MAURITIUS

Telecommunications Department

RESIDENT ENGINEER

DUTIES: To organise and supervise the changeover arrangements for the conversion of two main C.B. exchanges to automatic working.

Qualifications: Candidates must be A.M.I.E.E. or Grad.I.E.E. or possess a degree or diploma conferring exemption from the Institutions' examinations, and have relevant experience.

Terms: On contract for two years. Salary: £1,800 with gratuity. Free passages. Rented Government quarters or an allowance.

Write Director of Recruitment, Colonial Office, London S.W.1, giving full names, age, qualifications and experience, quoting BCD 133/52/05/D10. (A 44)

ALUMINIUM LABORATORIES LIMITED

(The Research and Technical Organisation of the international ALCAN Group of Companies)

An ELECTRICAL ENGINEER is required to work on experimental insulated aluminium cables. Applicants should have experience in the design, testing and manufacture of insulated power cables and should have suitable academic qualifications. Pension and Life Assurance Scheme in operation. Please apply to:

Personnel Officer,
Aluminium Laboratories Ltd.,
Banbury, Oxon.

(A 26)

ENGINEERING CLERK OF WORKS

required by Consulting Engineers to undertake site supervision of both mechanical and electrical engineering services contracts to new and existing buildings. Knowledge of steam, heating, ventilation and water services; electric lighting and power installations. Pension and life assurance scheme in operation, permanent position. Apply in writing giving full details to:

Pashler and Partners,
City Chambers,
Infirmary St,
Leeds 1.

(A 30)

MERSEYSIDE AND NORTH WALES ELECTRICITY BOARD

SECOND ASSISTANT ENGINEER

REQUIRED for the Technical Section of the Chief Engineer's Department, Board Headquarters, Love La, Pall Mall, Liverpool 3, to operate in the fields of telecommunications, supervisory control and special investigations.

Applicants should have a knowledge of telephone and radio equipment and experience in the planning of communication systems; also experience in the use of instruments and recorders.

Salary within range £1,375/£1,610 per annum (N.J.B. AX.5).

Appointment subject to medical examination. Pension Scheme.

Applications, on forms obtainable from the Assistant Establishments Officer at the above address, should be forwarded not later than 17 March, 1961. (A 66)

SOUTHERN ELECTRICITY BOARD

GENERAL ASSISTANT ENGINEER
MELKSHAM DISTRICT OF No. 2 (NEWBURY) SUB-AREA

SALARY: N.J.B. Class G, Grade 14 £670/£750 per annum). N.J.B. Conditions of Service.

The duties of the post will be to assist with distribution including minor construction work and general maintenance of H.V. and L.V. overhead and underground distribution systems, substation plant, etc. Applicants should possess suitable technical qualifications.

The successful candidate will be required to contribute to the Electricity Supply (Staff) Superannuation Scheme, if eligible.

Applications on forms obtainable from the Sub-Area Secretary, 7 Oxford Rd, Newbury, Berks, and returned to him, quoting Z.1326, not later than 13 March, 1961. (A 69)

THE ELECTRIC CONSTRUCTION COMPANY LTD.,

Bushbury Engineering Works, Wolverhampton.

GOOD VACANCIES FOR

SALES ESTIMATING ENGINEERS

to prepare tenders and specifications and to handle complete contracts for ROTATING ELECTRICAL PLANT and/or AUTOMATIC CONTROL GEAR.

Applicants should preferably have experience as estimating or contracts engineers, but consideration will be given to young electrical engineers without commercial experience.

Excellent opportunities. Profit sharing and pension schemes in operation.

Applications to the CONTRACTS MANAGER at the above address. (A 32)

TEST ASSISTANT

FOR LARGE TRANSFORMER TEST DEPT.

Staff position. Young man 23-30, with suitable background and experience as an electrician will be considered for training. Minimum commencing salary £13 per week.

Apply:

FULLER ELECTRIC LTD.,
Fulbourne Rd, E.17.

(A 71)

MEM

Applications are invited for appointment to our sales staff as representative operating within the South Eastern Electricity Board area. The position offers excellent opportunities for the right man—it is pensionable and a motor car is provided. Please apply in writing to General Sales Manager, Midland Electric Manufacturing Co. Ltd., Reddings La, Tyseley, Birmingham 11.

(A 20)

ELECTRICAL DRAUGHTSMAN AND ESTIMATOR/DRAUGHTSMAN

required by

J. LYONS & COMPANY LIMITED

(Ice Cream Division)

A vacancy exists for a Senior Electrical Draughtsman required to have experience on General Distribution, Lighting, Motor Controls, Process and Sequence Controls associated with Automation. Some knowledge of Electronics would be an advantage.

A vacancy exists for Senior Electrical Estimator/Draughtsman required to have experience of Estimating for Electrical Contracting Installations, based on General Distribution Lighting, Motor Controls, Process and Sequence Controls. This will involve a certain amount of preparation of drawings to be used as a basis of estimates. H.N.C. desirable.

An attractive salary will be paid to the right men and the appointment offers good prospects for further advancement.

The Company offers good conditions of service and a Contributory Pension Scheme.

Holiday arrangements honoured.

Applications will be treated in the strictest confidence and should be made in writing to:

The Personnel Manager,
Lyons Maid House,
Hammersmith Grove,
London W.6.

(A 51)

CENTRAL ELECTRICITY GENERATING BOARD
ASSISTANT ENGINEER (TELECOMMUNICATIONS)

required at the Central Electricity Research Laboratories, Leatherhead.

The successful applicant will be responsible to the Electrical Installation Engineer for the maintenance of the P.A.X. Systems (300 and 100 lines) and extensions thereto, and the Automatic Staff Location systems and subsequent extensions.

Candidates, preferably holding the City and Guilds Telecommunications Technicians' Certificate or an equivalent qualification, should have first class experience of this type of work with a manufacturer or the G.P.O.

Salary within the range £880/£1,165 p.a.

Applications stating age, qualifications, experience, present position and salary, to the Appointments Officer, 24-30 Holborn, London E.C.1, by 20 March. Envelopes should be marked "Confidential Ref. ET/97."

(A 74)

CENTRAL ELECTRICITY GENERATING BOARD

SOUTHERN PROJECT GROUP

PROGRAMMES DEPARTMENT

Applications are invited from suitably qualified engineers for the following appointments in the Programmes Department located at Finchley.

Applicants should be familiar with the problems relating to the overall planning of power station design and construction, be able to compile realistic and detailed programmes of work for all types of contracts and have ability to assess and report on the progress of work at site.

Preference will be shown to members of an appropriate professional institution or those who possess qualifications leading to membership. Applicants should have served a recognised engineering apprenticeship and have experience of generating station equipment, either in the manufacturers' works or on site. A knowledge of the civil engineering work involved would be an advantage.

Salaries will be in accordance with the National Joint Board Agreement, Schedule C, together with a London Allowance of £60 per annum.

SENIOR ASSISTANT ENGINEER

Scale 17, £1,650/£2,085 per annum.

SECOND ASSISTANT ENGINEERS

Scale 15, £1,400/£1,830 per annum.

THIRD ASSISTANT ENGINEERS

Scale 13, £1,285/£1,610 per annum.

Applications stating age, qualifications, experience, present position, salary and post applied for should be forwarded to the Administrative Officer, Central Electricity Generating Board, Southern Project Group, Squires La, Finchley, N.3, to arrive not later than 10 March, 1961.

Envelopes should be marked "Confidential—ref. S/61/5."

(A 31)

TAYLOR WOODROW CONSTRUCTION LIMITED

require

ASSISTANT ELECTRICAL ENGINEERS

to work in the Electrical Department at Southall.

Candidates must have experience in the design of electrical installations for industrial and general building works and the ability to prepare specifications and estimates.

DESIGN DRAUGHTSMEN

with similar experience to assist in the preparation of contract and working drawings.

Interviews can be arranged at any time, including Saturday mornings, with expenses paid.

Write to the Personnel Manager,
345 Ruislip Rd, Southall, Middlesex.

(A 15)

SOUTHERN REGION BRITISH RAILWAYS

require a

Technical Assistant

in the Office of Mechanical and Electrical Engineer (Traction), London Bridge, for work connected with Power Supply and Distribution. Knowledge of remote supervisory control equipment; switchgear and rectifier equipment; and/or high and low voltage cables and/or overhead lines will be of particular advantage.

Applicants should have had a sound technical training, having reached Higher National Certificate standard in Electrical Engineering or equivalent.

Salary range: £945 per annum rising to £1,020 per annum after two years.

Application forms may be obtained from the Chief Mechanical and Electrical Engineer, Southern Region, British Railways, 15 St. Thomas St, London Bridge, S.E.1.

(A 33)

SALES ENGINEER

is required by large Danish Company, already established in this country, to promote sales throughout the United Kingdom of contactor starter gear. Experience of selling in this market, energy and initiative are required for this position in a rapidly expanding organisation.

Details of experience, age and salary should be sent in confidence to Box No. 8221, Electrical Times.

(A 73)

ELECTRICAL SHIFT CONTROL ENGINEER

UNITED KINGDOM ATOMIC ENERGY AUTHORITY PRODUCTION GROUP

requires an Electrical Shift Control Engineer at

CAPENHURST WORKS CAPENHURST, CHESTER

to be responsible to the Electrical Operation Control Engineer for:—

(a) Operation of 132 kV switchgear, supervisory control of a number of large substations in accordance with instructions issued by the C.E.G.B. Grid Control Centre, and for the operation and control of E.H.V., H.V. and M.V. switchgear and ancillary equipment on the extensive power networks associated with this large and continuously operating chemical engineering works.

(b) Supervision of Shift Control and Substation staffs, issue of operational instructions and permits and preparation of statistics and electrical information.

A recognised electrical engineering apprenticeship, some years' experience in the control of large power networks with either a public electricity supply authority or a large industrial undertaking, and experience in the control of staff and industrial employees, are required. A good working knowledge of the various designs of switchgear, E.H.V., H.V. and M.V. and of all ancillary equipment including protective systems, experience in the operation of a Permit-to-Work certificate system and sound knowledge of the Electricity Regulations, are also essential. Possession of a Higher National Certificate in Electrical Engineering with exemptions leading to GRAD. I.E.E. is essential and a C.E.G.B. Authorisation, or its equivalent, will be an advantage.

Salary will be assessed within the scale £1,490/£1,715, according to qualifications and experience.

Contributory Pension Scheme.

Housing or assistance towards legal expenses on house purchase may be available.

Send postcard for application form, quoting reference CAP.272/J8 to Personnel Manager, at the above address.

Closing Date: 20 March, 1961.

(A 39)

ENGLISH ELECTRIC

STAFFORD

WISH TO RECRUIT AN

IMPULSE TEST ENGINEER

to assist in the testing of large transformers and other high voltage equipment using some of the largest impulse plant in the world. A certain amount of work will also be required on investigation into discharge and high voltage together with experimental and development work on the generator itself.

The successful applicant is not expected to have relevant impulse experience but must have a good technical background together with an H.N.C. He should have a keen interest in high voltage work and be confident that he can assimilate training quickly.

The post is a permanent and pensionable one and applicants should write giving full particulars to the Staff Officer, English Electric House, Strand, London W.C.2, quoting reference ET1290D. (A 38)

JAIPUR METALS & ELECTRICALS LTD.

JAIPUR, RAJASTHAN INDIA

Require the services of a fully experienced

METALLURGICAL ENGINEER

This company is a leading manufacturer of Copper and Cadmium Copper Conductors and other Copper Alloy products and Electricity Meters in India.

The successful applicant will be engaged in developing and implementing new lines of manufacture such as Catenary Wires, Grooved Wires, A.C.S.R., Enamelled Wires, etc. Applicants should have a good professional qualification with several years' experience in the manufacture of the above products. The position offers considerable scope and responsibility in a progressive and expanding Company.

Applications, which will be treated in confidence, should give details of age, qualifications, experience, remuneration desired. They should be addressed to the Director, Jaipur Metals & Electricals Ltd., Jaipur, Rajasthan, India. (A 22)

TAYLOR WOODROW CONSTRUCTION LIMITED

require

ELECTRICAL ENGINEERS

for installation and maintenance work on Civil Engineering and Building contracts.

Experience of tariff and service negotiations with Area Electrical Boards and knowledge of contractor's equipment is desirable.

These posts involve extensive travel and candidates must hold a current driving licence.

Interviews can be arranged at any time, including Saturday mornings, with expenses paid.

Write to the Personnel Manager,
345 Ruislip Rd, Southall, Middlesex.

(A 16)

South Wales Switchgear Limited

have vacancy for

CHIEF RESEARCH and DEVELOPMENT ENGINEER

in the Company at the Blackwood Headquarters. Applications are invited from suitable engineers having wide experience in electrical engineering spheres. Applications will be treated in confidence and should be addressed to:

The Managing Director,
SOUTH WALES SWITCHGEAR LTD.,
BLACKWOOD, MON.

(A72)

BRITISH OVERSEAS AIRWAYS CORPORATION

Properties Maintenance Engineer, Karachi

Applications are invited from men aged 25 years and over, with a good standard of general education, for the post of Properties Maintenance Engineer, Karachi.

Initial engagement will be at London Airport and subsequent employment in Karachi. Salary: U.K. range £1,005/£1,190, on posting to Karachi Rps. 1,740/Rps./2,075, plus free furnished accommodation, Marriage and Children's allowance—tax free.

Essential qualifications: Experience with Diesel Generators, and operation of Power House, Heating, Air-Conditioning and Cold Storage systems. Maintenance of Electrical, Power and Lighting Installations. Also control of Contractors and ability to read drawings and understand specifications.

Applications to be forwarded to Personnel Manager, Eastern Routes, M.326, H.Q. Building, B.O.A.C., London Airport, Hounslow, Middx. (A 48)

LONDON ELECTRICITY BOARD

ASSISTANT DISTRIBUTION ENGINEER

APPLICATIONS are invited for the above position in the Board's Essex Suburban District at 497-9 Ley St, Ilford.

Applicants should have a sound technical education to the standard of the Higher National Certificate and possess practical experience of engineering work associated with the organisation of a District distribution department.

The post is graded under Schedule A of the National Joint Board Agreement as Class H, Grade 12, £875 per annum, rising to £990 per annum, inclusive of London Allowance.

Applications stating age, qualifications and experience should be sent direct to the Manager, Essex Suburban District, 497-9 Ley St, Ilford, within 14 days of the publication date of this notice. Please quote ref.: PER/V/3205/T. (A 76)

NORTH OF SCOTLAND HYDRO-ELECTRIC BOARD

South Caledonia Areai Blackfriars, Perth

APPLICATIONS are invited for the following posts:

FIRST ASSISTANT DISTRICT ENGINEER
DUNBLANE
GRADED E.4 (£1,190/£1,325)

Applicants must be technically qualified and preferably Corporate Members of the I.E.E. Planning, construction, and operational experience essential. A Car Allowance will be payable.

FOURTH ASSISTANT ENGINEER
AREA HEADQUARTERS, PERTH
GRADED G.14/13 (£670/£750/£805)

To assist the Contracts Engineer in the preparation of estimates and tenders for engineering construction.

Applications, on special forms, must be submitted within 14 days of this advertisement. (A 56)

The British Electrical & Allied Manufacturers Association

APPLICATIONS are invited from qualified men within the age bracket 30-35 for the post of TECHNICAL ASSISTANT in the Switchgear department at Ascot.

Applicants should have:

(a) a good education background;
(b) experience with switchgear and ancillary equipment;
(c) administrative ability, personality and tact.

Some familiarity with the work of technical committees and the production of specifications would be an advantage.

A salary will be paid commensurate with qualifications and experience. There is a contributory staff superannuation scheme.

Applications should be addressed to the Secretary of the Association, 36 Kingsway, London W.C.2. (A 60)

LONDON ELECTRICITY BOARD

ENGINEERING DRAUGHTSMAN

APPLICATIONS are invited for the above position in the Board's North Western District at Lithos Rd, Hampstead, N.W.3.

Candidates should have a good general and technical education and be in possession of the Ordinary National Certificate, be neat and capable draughtsmen and be experienced in one or more of the following subjects: drawing office routine, electrical diagrams, lay-out of plant in transformer chambers, mains survey and recording of mains work. A knowledge of building construction would be an advantage.

The post is graded under Schedule A of the National Joint Board Agreement as Class H, Grade 13, £815/£920 per annum, inclusive of London Allowance.

Applications stating age, qualifications and experience should be sent direct to the Manager, North Western District, Lithos Rd, Hampstead, N.W.3, within 10 days of the publication date of this notice. Please quote ref.: PER/V/3221/T. (A 47)

Box No. replies to be addressed to the ELECTRICAL TIMES, Sardinia House, Sardinia Street, London, W.C.2

CENTRAL ELECTRICITY GENERATING BOARD

Midlands Division

SHIFT CHARGE ENGINEER

REQUIRED at Worcester Power Station. N.J.B. service conditions, superannuable appointment, salary within Schedule A, Grade E.7, £965/£1,090 per annum, plus 10% shift allowance.

Applicants should have a sound technical training and practical experience in the operation and maintenance of steam generating plant and main switchgear. Appropriate qualifications desirable.

Apply, quoting vacancy number 36/61 MD, on form A.E.6, available from the Station Superintendent, Worcester Power Station, Hylton Rd, Worcester, to whom they should be returned to arrive by 10 March, 1961. (A 42)

CABLE CONTRACTS ENGINEERS required with experience installations to at least 33 kV. Must be prepared travel anywhere in U.K. Apply giving details of work carried out to Contracts Manager, Enfield-Standard Power Cables Ltd., Stockingswater La, Brimsdown, Middlesex. Tel. No. Howard 2711. (A 19)

CONSULTING ENGINEER requires JUNIOR ELECTRICAL DRAUGHTSMAN for assistance on internal installation planning in new buildings. Luncheon vouchers. Applicants should stage age, experience and salary required.—G. H. Buckle and Partners, 2 Harrington Gdns, London S.W.7. (A 75)

ELECTRICAL INSTALLATION INSPECTOR/TESTER required by Consulting Engineers to visit oil installations in Midlands and North of England. Experience of flameproof installations essential. Write to A. J. RAMSAY AND PARTNERS, 5-6 Promenade Chambers, Edgware, Middx. (A 23)

ELECTRICIAN required. Must have experience of installation and maintenance of extensive industrial plant with remote control and sequence interlocking, using all types of wiring. Must be prepared to work on three-shift rota. Shift rate 7s 9d per hour, permanent position. Pension and sick pay schemes. Please apply: Personnel Manager, Quaker Oats Ltd., Bridge Rd, Southall, Middx. SOU 2388. (A 21)

ELECTRICAL ESTIMATOR required for Mid-Tyne shipyard. Applicant must be conversant with modern marine a.c. and d.c. electrical ship installations; capable of taking charge of an estimating section and working with the minimum of supervision. Apply to Box No. 8217, Electrical Times. (A 29)

FOREMAN. Large Company dealing with Electrical Transmission and Distribution require the services of an experienced Foreman for work on cable laying contracts. Please send details of previous experience to Box No. 8219, Electrical Times. (A 36)

LABOUR AND PLANT SUPERVISOR required for Contracting Section of large electrical company.

Applicants should be thoroughly experienced in cable installation, jointing procedure and handling of labour, together with the purchasing and maintenance of suitable plant.

An intimate knowledge of the rates of pay and conditions of working applicable to the appropriate trades essential. Permanent superanunated post. Write stating age and details of previous experience to Box No. 8215, Electrical Times. (A 28)

OVERHEAD LINE ENGINEER required by Consulting Engineers in their Head Office. Experience required in Design and Contract work of tower and wood pole lines. Applications stating age, qualifications, experience and salary required to Kennedy and Donkin, 12 Caxton St, London S.W.1, quoting Ref. JGW/HSJ. (A 35)

POLYPHASE TEST. Experienced TESTERS or IMPROVERS. These vacancies afford unique opportunity for experience on calibration of a wide range of integrating electricity meters and ancillary equipment. Staff status after qualifying period. Please inquire: Personnel Manager, Landis and Gyr Ltd., Victoria Rd, North Acton, W.3. ACOrn 2282. (A 18)

RELAY DESIGNER required by established electrical company, to design complete range of protective and auxiliary relays. Applicants must be fully experienced in modern techniques of relay design and manufacture. Salary will be commensurate with experience and qualifications. Applications, giving full personal and professional details, to Box No. 8209, Electrical Times. (A 17)

ROUND OAK STEEL WORKS LTD. require an Electrical Engineer as Assistant to the Chief Electrical Engineer. The appointment carries responsibility for technical development and improvement under the general guidance of the Chief Electrical Engineer. Candidates, preferably with experience in the heavy electrical field, should possess H.N.C. minimum, or graduate standard qualifications.

Write, giving age, details of experience, qualifications and salary level expected, to the Manager, Personnel Dept., Round Oak Steel Wks Ltd., Brierley Hill, Staffs. (A 50)

SURVEYOR required for Wood Pole Line work. Permanency right man. Kirriemuir area.—B. French Ltd., Pike Mills, Kidderminster. (A 43)

AGENCIES

AGENT required. Preferably in Gloucester or Bristol area to handle small rotating electrical machinery. Agency for Cornwall, Devon, Somerset, Wiltshire, Gloucestershire and South Wales. State agencies now held when replying. Please write: Sales Director, Small Electric Motors Ltd., Beckenham, Kent. (A 27)

BUSINESS OPPORTUNITIES

ELECTRICAL WHOLESALERS small/medium sized. Some radio. Excellent leased premises, North London. Box No. 8191, Electrical Times. (A 13)

SAVE TAX—Limit Your Liability. Brand new Limited Companies available immediately. Ready to trade today. Cost: £20 (everything inclusive). Companies also formed to order: £10 10s (excluding Duty). WILDMAN AND BATTELL LTD., 13 Well Court, E.C.4. CITy 2545. (A 41)

WANTED

WANTED for prompt cash, ferrous and non-ferrous SCRAP; also plant for dismantling. Buyers of second-hand machinery and plant for re-use.—W. and H. Cooper Ltd., 17 Brady St, Bethnal Green, E.1. (A 1)

WORK WANTED

DRAWING Office facilities, Electronic, Electro-Mechanical, Test Gear Designs, etc. For personal attention Ring Acorn 6044, F. Smalley, 60a High St, Acton, London W.3. (A 14)

METALWORK.—All types of cabinets, chassis, racks, etc., to your own specification. — Philpotts Metalworks Ltd., Chapman St, Loughborough. (A 10)

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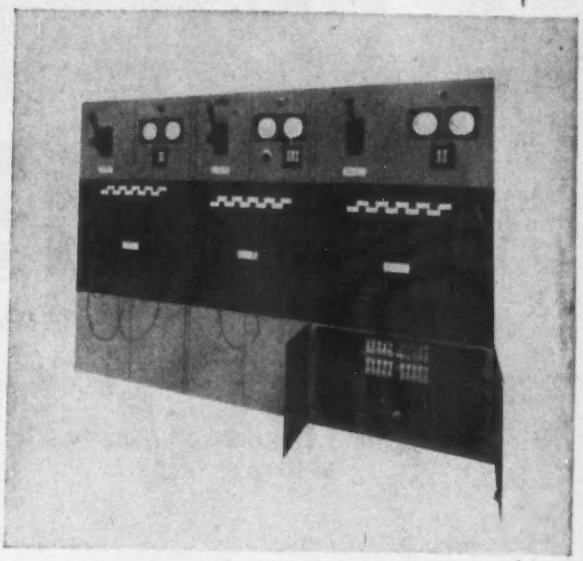

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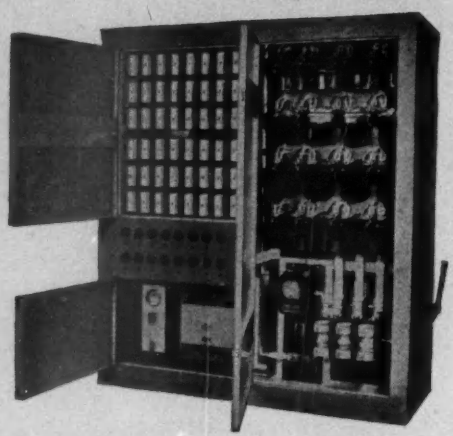

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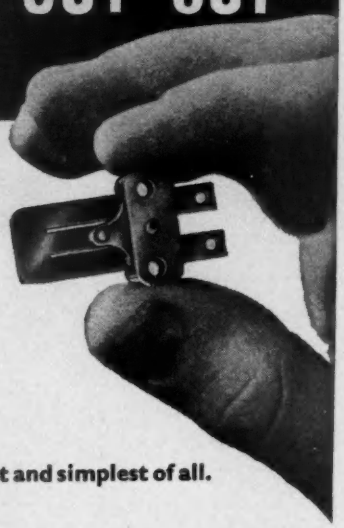

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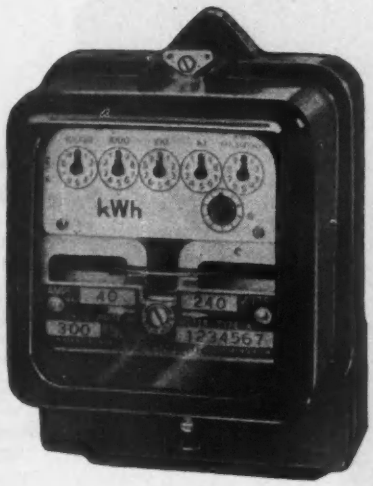

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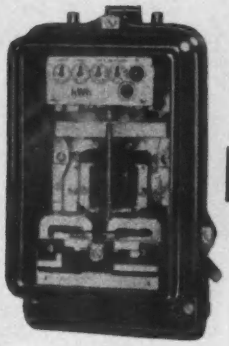

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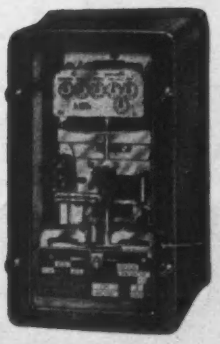

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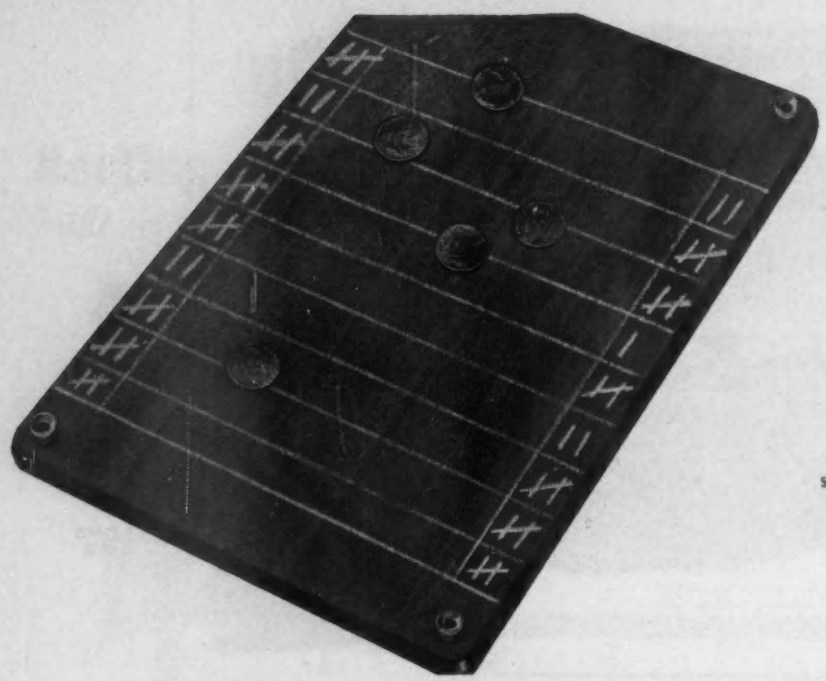

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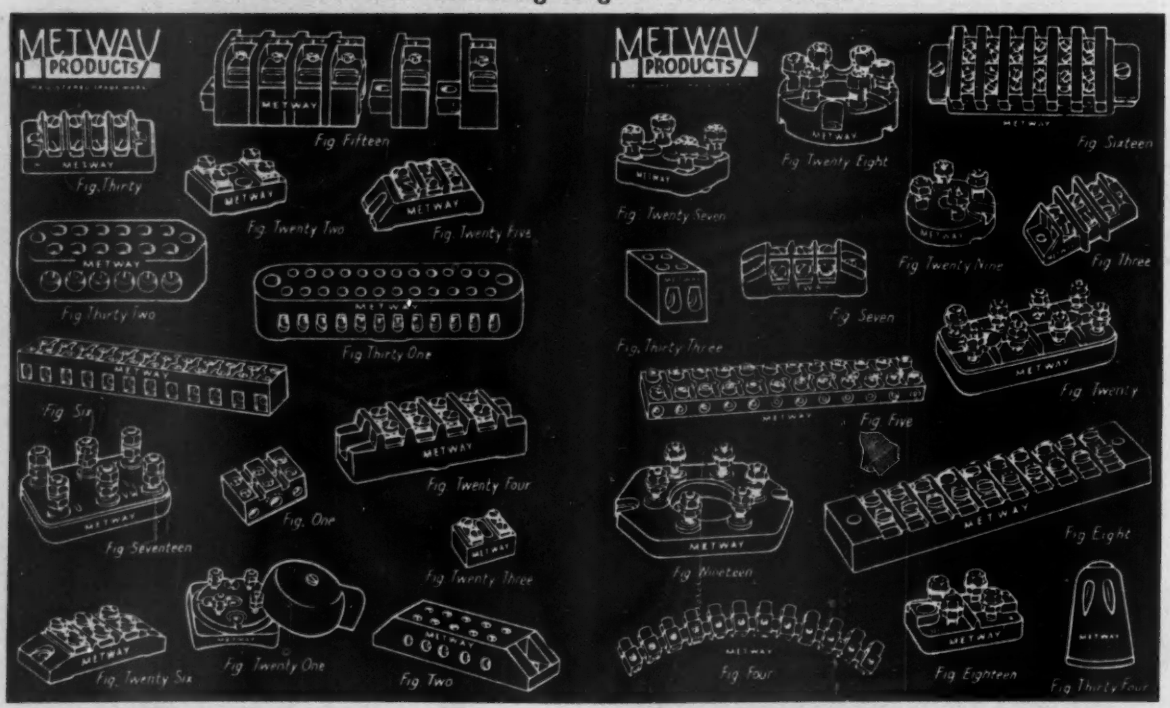

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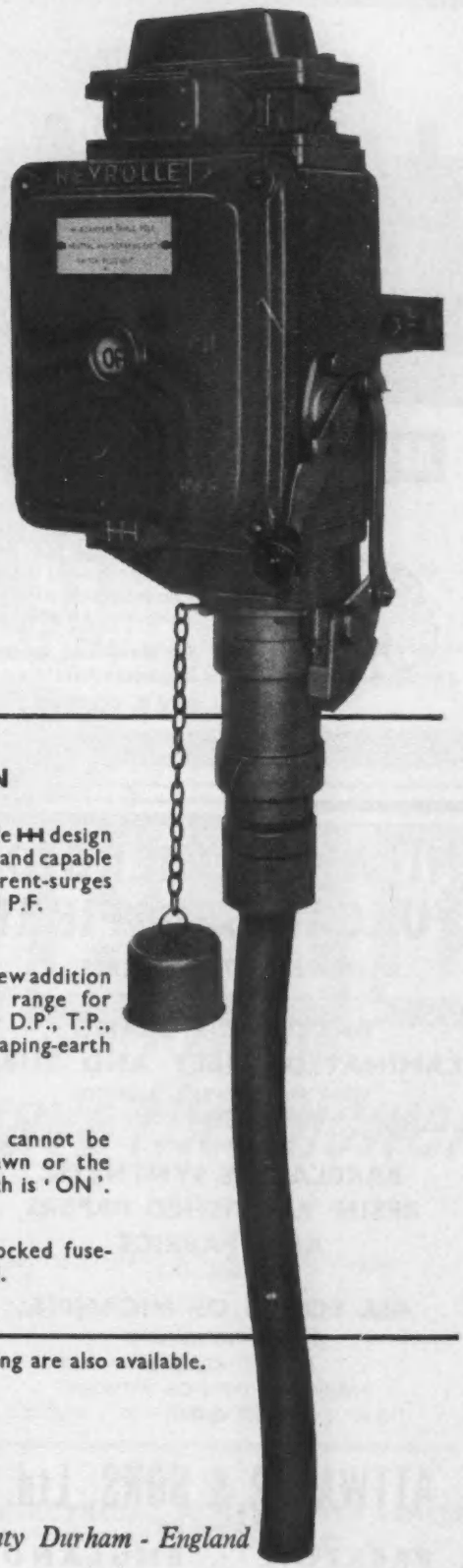

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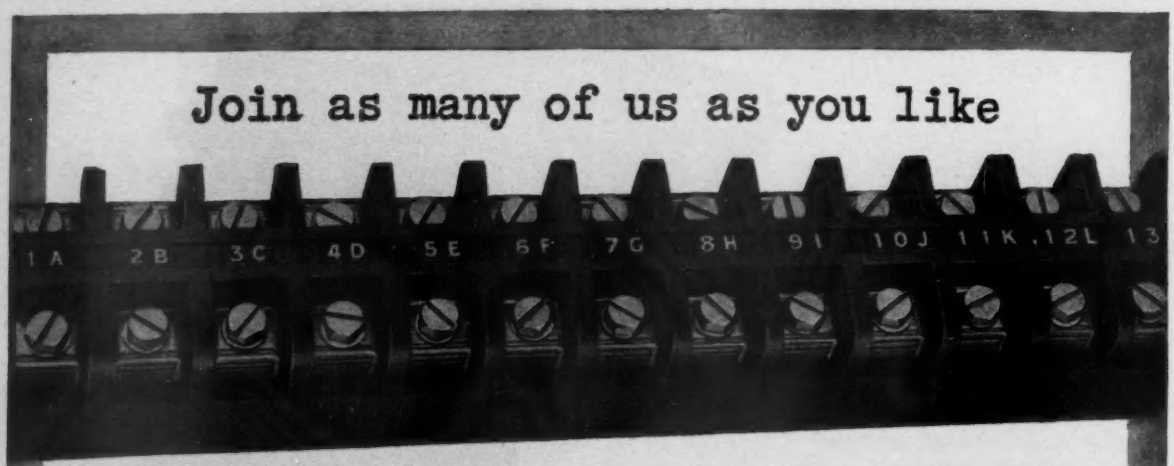
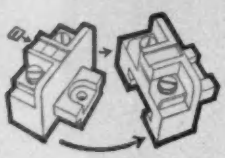


M-TE MULTI-LOCK TERMINAL BLOCKS



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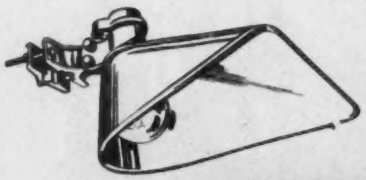

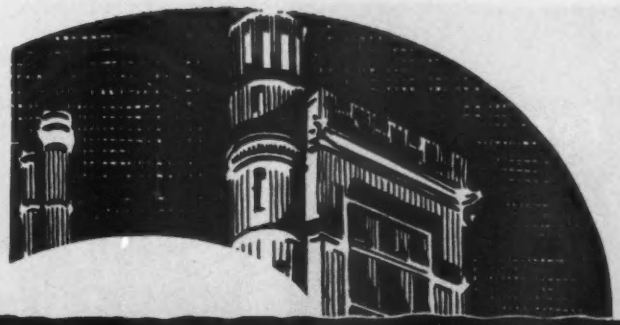

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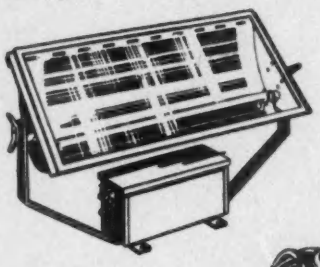

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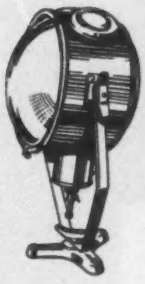

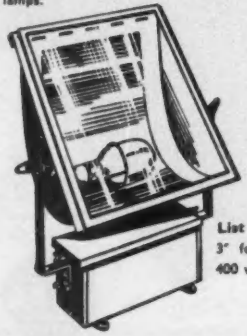

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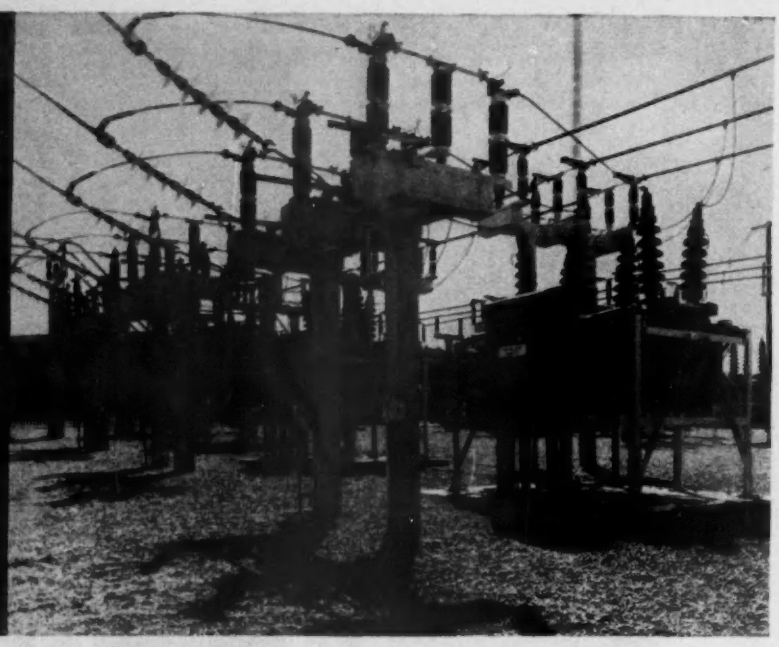

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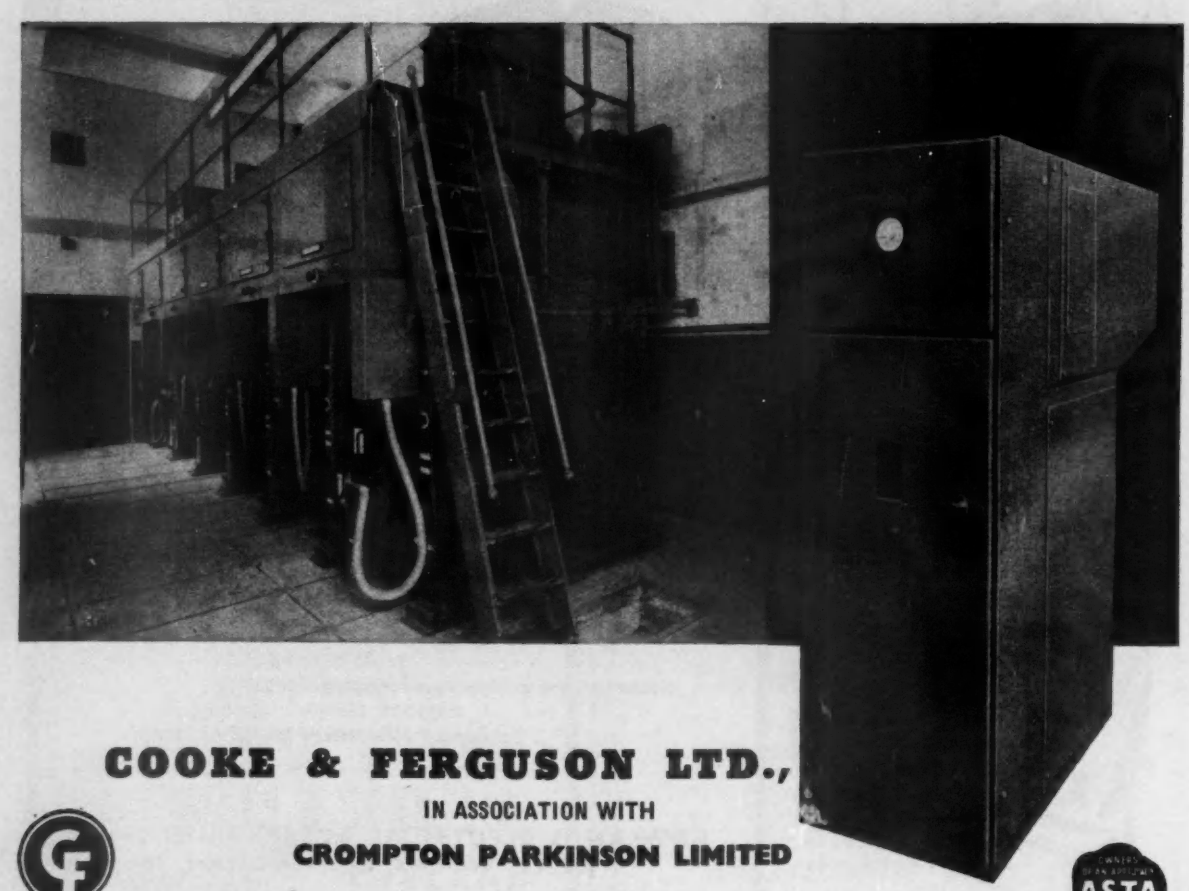

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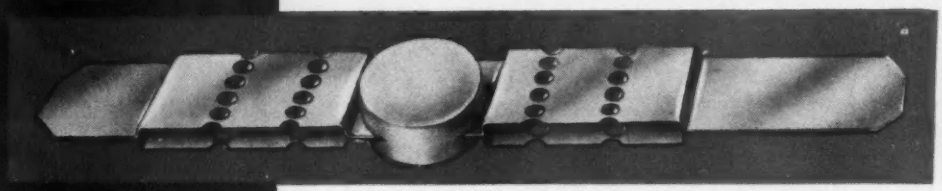

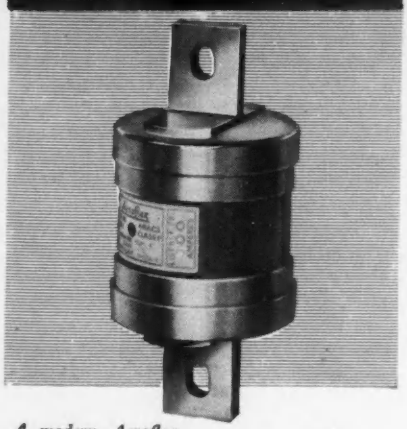

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4 out of 5 women prefer a bulb whose whiter light is kinder to the eyes
They go for NETABULB

This may be an advertisement, but it's certainly no pipe-dream that "4 out of 5 women, given a choice, prefer the Mazda NETABULB". So say the Market Research men who did the counting in a recent independent survey.

A.E.I. LAMP & LIGHTING CO. LTD
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4900

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Lamp and Lighting Co Ltd

Mazda lamps stay brighter longer